The Builder.

VOL. XXXIV. No. 1726. SATURDAY, APRIL 4, 1876

ILLUSTRATIONS.

Leather Warehouses, Bermondsey.—Mr. Billing, Architect 214
Street Architecture, Manchester.—Messrs. Pennington & Bridgen, Architects 215

CONTENTS.

Professor Edward M. Barry's Lectures on Architecture 213
The Shakspeare Memorial Competition at Stratford-on-Avon 207
Annals of the Congress of French Architects 208
Architecture at the Royal Scottish Academy 209
The Relation of Modern Engineering to Public Health and Local Government 210
"Cubitt's," Gray's-inn-road: Visit of the Architectural Association 211
A New Recreation Ground for Sydenham 212
"Aquaria and their Construction": Civil and Mechanical Engineers' Society 212
Extension of the Metropolitan Railway to Aldgate 213
Inauguration of the South Metropolitan Temperance Hall 213
Assessment of Property at the West End 213
Passenger Traffic between England and France 213
The Cost of German Railways 213
New Warehouses, Weston-street, Bermondsey 214
Street Architecture, Manchester 214
Art and History at St. Alban's 214
Light and Colour 218
Colour 218
Sanitary Police 218
A Deserved Recognition 218
Proposed Royal Albert Bridge, Canada 218
Coats of Arms, Leicester Municipal Buildings 219
Chapel, Vicars' Close, Wells, Somerset 219
Piece-work 219
Fine Feathers make Fine Birds 219
New Method of Firing Pottery 219
National Federation of Employers 220
Rough Estimate not Binding: Vestry of Islington v. Freeman 220
Nuisance caused by Brickburning: Buffy v. Stevens 220
Compensation Case: Schleischer v. Metropolitan Board of Works 220
Arbitration Case: Hopson v. London School Board 220
Borax in Paste 220
Ecclesiastical Dilapidations 220
Patent Ventilation 220
Knightsbridge Barracks 220
Errors of Levelling: The Institution of Civil Engineers 221
"The Degradation of the Painter on Glass" 221
Education of Bricklayers 221
Carrying Tools 221
Church-Building News 221
Dissenting Church-Building News 222
The Winchester Guildhall and its Architects 223
"Dusting and Slopping" Contracts in St. Pancras 223
Dispute as to an Architectural Partnership: Wm. H. Lynn v. Sir Charles Lanyon and John Lanyon 223
A Builder's Claim for Plans: Perkins v. Williams 223
The Systematic Measurement of the Human Figure 223
Stained Glass 223
Books received: The Late Visitation of Typhoid Fever in Uppingham (Spon) 224
Miscellanea 224

*Prof. Edward M. Barry's Lectures on Architecture.**

THINK I may perhaps profitably commence the first lecture of a new series by attempting to consider what may be the scope of an architect's duties, in the ever-changing circumstances among which he is likely to be called upon, in the future, to apply his art. Like all true artists, he will inquire how far he may expect to draw his inspiration from nature; and we may therefore also briefly consider what are the lessons which nature can teach us. As architects, moreover, must work in the midst of mankind; we may further see how they are to apply the principles they may have derived from nature, to their practice in crowded cities, and among the fever-haunted dwellings of the poor. To do this successfully, will tax their powers, both as artists and constructors, and may raise the question of that division of responsibilities, under these two heads, which has been a favourite idea of some theorists.

In an age which accepts the doctrine that every wish must have its justification, and that society is to be based on the principle of the "greatest happiness of the greatest number," the nineteenth-century architect is ever brought face to face with utilitarianism. He has to study social difficulties, and to ask himself how his art is to solve the problems to which they give rise. He may stand aside, like the rustic, while the stream rolls on, or he may strive to guide, control, and elevate, that which he is powerless to prevent. New provisions may be necessary for new wants, and an instructed society may perhaps find, in co-operation, a force to oppose to ignorance, and selfishness. I propose to-night to ask your attention for a short time to these points, as I think they raise questions on which a little thought on your part may not be thrown away; and to bring out such thought is the main object of these lectures. Let us first consider the aspect of nature towards architecture.

Since we last met in this place, I doubt not that many of you have been seeking health and recreation in travel. Some have, perhaps, devoted their time to the inspection of the great artistic monuments of the world. Others, and probably the larger number, have found their greatest happiness far from busy towns, amidst the plashing of waterfalls, the roaring of avalanches, or the glories of heath or sea. Nor, although architecture, as a technic art, may not seem to gain directly from holidays thus spent, am I disposed to say anything in opposition to such a course. It may be, that we are always apt to have a tendency to excess, so that our very virtues may become vices, "to scourge ourselves withal." A restlessness of body and of mind often leads to a course of travel, which is more of a toil than a pleasure, and leaves on the mind shadows of objects, and fragments of theories, half seen, and half digested, of no more value to the art-student than the feverish dreams of a brain-sick man.

I will not assume, however, that this is the spirit and temper of those among you who have devoted yourselves to the study of an art, such as architecture, which demands the serious purpose of a life, and which possesses an importance, as regards the public weal, to which a tardy justice seems now to be in some degree rendered.

If, therefore, those of you who, as architectural students, pass the major portion of your time in the study of lines, arches, and angles, devote a vacation's leisure to the enjoyment of the works of nature, I do not question, that in so doing, you follow a wholesome instinct.

Architecture, with all its glories, is but a work of man, easily comprehended, imitable, finite. How then can it be compared with the creation of God, infinite in variety, beauty, and power? The study of the former is necessary to the instruction of a skilful architect. A reverent love and admiration of the latter seems to me an essential portion of the character of a good man.

I would not have you infer, however, that I would draw any sharp line of demarcation between the love of Nature and the love of Architecture. There is, and should be, no necessary discordance between the two, though I cannot but admit, that there is a certain inferiority, in this respect, of our art, as compared with painting and sculpture.

These latter draw more directly on the fount of inspiration supplied by Nature, and no man who is insensible to her charms can ever be a great artist.

To an architect, any direct borrowing from nature is forbidden. He may accept principles, but their application must be determined by the rules of art, which exclude actual imitation. I do not, of course, forget the pleadings of some among us, for the exact reproduction, in architectural details, of examples of life from the animal and vegetable kingdoms. I pass this over for the present, not only as a controverted theory, but because it deals only with details, such as capitals, string-courses, key-stones, and the like, which are after all only the subordinate parts of an architectural design. To the composition, as a whole, no such naturalistic theory can apply. No one, as far as I know, has yet proposed to build a house in the form of a tree, and we may dismiss from our minds any idea of direct imitation of Nature. In the crags of mountainous regions, a certain resemblance to castles may at times be imagined, but this would only apply to a distant view, which would take in the outline only; and not to the details and accessories, which would destroy all illusion on a closer inspection.

It is evident, therefore, that imitation of nature being forbidden to the architect, our lesson from her, architecturally speaking, must be negative, and I think much may be learnt in this way. Bear in mind, however, that, as I said just now, we must look for principles, not for their detailed application.

Let us, for a moment, try to analyse the effect produced on the spectator of natural beauty. He sees first variety; not any regular balance of parts, as in a great cathedral or temple; not formality, not regularity. No portion of a hill, river, or landscape, repeats any other part of it. The variety is infinite, symmetry, in an architectural sense, altogether absent. Light and shade are not, indeed, excluded, but they are subordinated to colour; pure, abundant, and local. No two trees, boughs, or even leaves, are absolutely alike.

Again, nature charms by motion; ever active, incessant. However still the sky, the leaves are restless, the waters ever bubbling in their pebbly beds, the animals fulfilling their appointed destiny. The clouds never remain the same; at one moment rolled into heaps of smoke-like mistiness, at another breaking out into the likeness of "gorgeous palaces, and cloud-capped towers." We see them perhaps, for a time, wearing a dull and leaden garment, to find them breaking forth presently into chameleon hues of colour, which no painter can rival.

You will notice that I have spoken here of the means by which Nature addresses herself to the eye. This is the aspect with which the architect is chiefly interested; and we need not concern ourselves here with the scarcely less important appeals she makes to the other senses, the music of her winged songsters, the perfume of her flowers.

The architect, having fully recognised his inability to find actual precedents in nature, has next to teach himself that in opposing her principles of beauty, he may find lessons for his artificial practice.

For, as we have seen, the principles which we admire in natural beauty, are exactly those which we neither wish, nor expect to find, in architecture. Against variety; we seek symmetry, formality, order: against motion; repose stability, unchangeableness.

Symmetry does not exclude variety in detail, but it requires a balance of parts, such as we do not see, in the inanimate works of nature. In all great architectural masterpieces of antiquity, you will find this balance of parts, not forced, or overstrained, but arranged simply; in accordance, it may be, with routine or precedent; but satisfying both the imagination, and the actual sense of sight.

You will not misunderstand me, by supposing that I mean here by symmetry any rigid uniformity of centre, and wings, nave and aisles, one on this side, and one on the other, regardless of

* First lecture, delivered at the Royal Academy, on the 24th of February, 1876.

the special circumstances of each case. No, I do not mean this: I am thinking rather of the symmetry which manifests itself alike, in the Greek temple, and Mediæval abbey; a recurrence of subsidiary details, each necessary to the other, a harmony of features, measured, orderly, and dignified. You may, of course, have a mere mechanical regularity, where each part may repeat its fellow, until it disgusts with its poverty and its insipidity.

But none the less is it true that our art loves a true symmetry, and finds its greatest effects in a repetition of well-proportioned parts. You know the beauty of the "long-drawn" aisle of any of our great churches, and the same principle holds good in more barbaric structures, such as the great Hall at Karnak, or the temples of India; while it also applies, with especial force, to the works of the Greeks.

Again, we seek in architecture repose and stability, as opposed to the motion of Nature. With her, everything is in perpetual change. The seasons press upon each other. Earth, air, and sky have each their thousand signs of life; and with life come change and motion. The sighing of the wind, the murmur of the stream, the hum of myriads of insects; all these proclaim the prevalence of change, the provisional character of the world in which we live.

Against this, in architecture, we oppose our attempts at permanence,—a permanence limited, indeed, by many shortcomings, but not without such a measure of success as to be able to exert a powerful influence on the mind. We know how strenuous and earnest have been the efforts of all ages, in this direction. "*Non omnis moriar*" was the touching cry, half boastful it may be, but full of pathos, of the Roman poet. There is no history, no mythology, which does not indicate the repugnance of the soul to the thought of extinction. Whatever criticisms we may hear on theological systems, we come upon this solid incontrovertible fact, that all times and nations, all philosophies and religions, have revolted from the idea of annihilation, and have sought in our art for enduring memorials of their aspirations. This it is which gives to architecture, one of its principal sources of power. Of course, she has no actual charm against that terrible fiat of change which has gone out against all human work. Her arches totter, and her stones crumble. Her permanence is only relative, but, such as it is, it is a powerful influence, and affects us all in a more or less degree. The visitor to the Pyramids, to Athens, or to Rome, feels a new interest in the people to whom the monuments he sees around him were household words; and the contrast between what has been, and what is, is calculated to teach lessons of grave and serious import to the most thoughtless among us. Alas for those who are past such lessons!

Architecture, then, has within its reach an interest due to the efflux of time, which is not shared by the other arts. The latter depend more completely on present sense. A symphony of Beethoven is neither more nor less sublime now, than when it first started from the brain of its afflicted composer. It is the same with a sculpture of Phidias, or a painting by Raffaelle. These works of artistic genius owe nothing to time,—in fact, they are more likely to be injured by it, than to gain anything by its influences. With us, it is different; the mellowing effect of time on architecture has a charm all its own, linking the past with the present, blending one age with another, and exciting powerfully the imagination of men.

Look, for example, at the study of archæology, see how it unites various tastes and natures; observe its almost too powerful influence on the architecture of the day.

And this leads to the consideration of a point which I dare say troubles many of us. In what will the architecture of to-day interest our successors? A writer on art has lately inquired, "Will the restorations on which this age has prided itself ever become a bye-word of reproach, as similar works, vaunted in their own day, have become among ourselves?" I noticed an expression of the same feeling, not long since, with reference to a work contemplated by one of the most highly-educated societies in this country. "What guarantee," it was asked, "have we, that, in thirty years, the notions of the present day may not have become antiquated and shocking to the tastes of our sons, and grandsons?" It is difficult to answer this question, if we are to have no higher aim than the fleeting fashion of the hour. I believe your safeguard will be in the application of common sense to architecture. Ask yourselves, not what is fashionable, but what is reasonable; for, depend upon it, good architecture has ever been founded on reason, and common sense. Fashion arises from a thousand passing influences, all of them more or less unworthy. Ostentation and vanity are its parents, and with them, it deserves to fall. If you would succeed in your art, avoid these pitfalls; seek to meet existing wants unobtrusively and sensibly. Do not believe that it is the duty of the architect to construct "startling effects"; rather aim at strength, solidity, and simplicity, and thus you will be on the way to obtain that permanence of interest, which we admire in the achievements of earlier times.

Once more, there is no vulgarity in nature. So should it be in architecture. Feebleness, however, is not the negation of vulgarity. Churchwardens' whitewash is not the evidence of a pure taste. We must seek the latter, rather in the absence of apparent effort, and in the harmony of colour and form. You know how the slang of the day stigmatises some peculiarities of costume or manners as "loud." Now, nature is never "loud," and you should eschew "loud" architecture; regardless of the praises of fashion, which may offer you the empty satisfaction of the moment. If some startling peculiarity challenges your notice, regard it with distrust, for the mission of architecture is not to startle, but to satisfy.

With repose in architecture is associated stability. We must be satisfied of the one, before we can appreciate the other. To obtain stability, in an artistic sense, a reserve of power is needed. It is not enough for us that a building stands. Our judgment must be satisfied that it ought to stand, and that it will go on standing. We must obtain on this head perfect satisfaction. It is the want of this confidence, which troubles us with so much of the iron constructions of the day. We see great spans covered, or bridged. We look up at the roofs, and are glad to get from under them. Will they last? The engineer will tell us the tensile strain on an iron plate, and the number of inches of sectional area necessary by calculation, and assures us that the stress upon his roof is well within the calculated strength. It may be so: our judgment may be convinced, but not in an artistic sense. The thing is bald and uninteresting; and we think of works of architectural art, as to which no such questions intruded themselves, because the requirements of true architecture were effectually supplied. The Mediæval architects were not always proof against the temptation of seeking to construct mere *tours de force*. Of such you may find an example in the Cathedral of Beauvais. Here the ambition of the architects to surpass what had previously been done led them to mistake bigness and daring construction for art. The spire has fallen, the roof gave way soon after its erection, and the nave arches have had to be strengthened by the insertion of intermediate columns, bisecting the original arches. Want of repose and stability are fatal to the artistic effect of the design, which deserves study, however, as an exaggeration and a warning.

To secure stability in architecture a margin of strength is therefore required over and above the necessary demands of the moment. In actual professional practice this is not always easy to obtain, so great is the demand for cheapness of construction, and architects not only live to please, but must please to live. How many of our cathedrals would be left to us if they had been built on a ninety-nine years lease? To our shame, be it said, there are few countries in which flimsy building is so much the rule as in our own. Low rents are more thought of than healthy homes. Thin walls and unsteady floors are regarded with indifference; and if it were not for the great value of land in our large towns, would have even more serious consequences than they now involve. Happily for us, one evil goes some way to cure another. Houses [at least in London] are so closely packed that they sustain each other, and also aid their neighbours with their surplus heat. But without good solid building there can be no architecture worthy of the name, and you must ever be on your guard against flimsiness and instability. If you are stinted for money, prune your ornament with an unsparing hand; part, however regretfully, with your carving or your pet effects; better by far put your substance into your walls. They may at least reward you with good, solid-looking reveals, with their effective shadows. At any rate, it is better to live in a substantial barn than in a flimsy palace, tottering to its fall.

I once heard a prominent civil engineer say that every railway-station ought to be pulled down and rebuilt every ten years. The growth of traffic, and of modern wants is rapid, and such structures are too often built for utility alone. Architecture, however, will not be satisfied with so brief an existence. It must aim at so much of permanence as it is permitted to mortals to attain; it must hand down the present to future ages, even as the past speaks ever to ourselves.

Do not believe that, in applying common sense to your architecture, you will necessarily injure its artistic effect. Such a creed would be an insult to your art, for it would imply that between it, and common sense there is a gulf. This is not the case. Observe Nature once more. How simple and sensible is her construction! Look at a tree in the full glory of summer verdure, with its weight resting on a single trunk. There is the type of the architectural column, utilitarian if you will, but also a truly artistic expedient for carrying weight. You will not find Nature placing the weight on the ground and the column in the air; nor will you see her shafts dotted about the structure as misapplied ornament. Here is an instance as to which we may fairly enough take a direct lesson from Nature, and remember that a column should have a reason for its existence.

The love of Nature, therefore, is good for the architect. It is good for him to be surrounded by beautiful things,—refreshing the eye, too much offended by its daily work among mean, or commonplace objects. He can study the eternal principles of beauty, and ask himself how to apply them to his art. Amongst the works of God, he may cultivate simplicity of character and refinement of feeling, which will surely make themselves felt in his works; for you can only get from a man what there is in him. Descending from principles to details, he will know how to admire Nature's harmonies of colour, form, and proportion, which will put him on his guard against those conceits and extravagances which too often mar modern architectural designs. If he is at times tempted to rebel against the utilitarian side of our art, and to complain that he is made to serve tables, let him notice how wonderfully adapted are Nature's means to her ends. Take the hollow stalk of a bulrush, for example, where you have the application of least expenditure of material, in the form of greatest strength. However seemingly prodigal of her resources, Neture, while neglecting nothing, is never wasteful or inharmonious. She has lessons for all, and for none more than the architect.

We have, however, to consider the other phases of his existence. An architect cannot be always indulging his taste for natural beauties. His art must lead him to the busy haunts of men, and there it will be chiefly exercised.

The gregarious instincts of mankind have ever led them to assemble themselves in cities. In early times of unsettled government, the guarantee of mutual safety supplied an obvious motive; with us, the claims of business constitute an inducement of no less strength. You all know the wonderful growth of London and other large towns, both here and in America.

Now this growth is but too often a matter of very mixed satisfaction. The architect has too few opportunities of guiding it, and mistakes are made which are irrevocable, and entail injurious consequences, of more or less serious import.

It is not of much use to rail at great cities, as monsters and abominations. This world of ours, as it advances in years, must of necessity become more crowded, and men will congregate in cities, for powerful reasons, against which objectors are impotent.

I think we should be on our guard against falling too readily into a spirit of general discontent. This is a tendency to which our countrymen are, perhaps, somewhat specially prone. We see very clearly evils which are before us. This is a good thing, for it is the first step towards a remedy. But we do not always allow so readily for advantages, more or less counterbalancing the grievances, of which we complain. Thus, we are most of us painfully alive to the mischief of overcrowding in our large towns, but we may not always be aware of the gains, of various kinds, as well intellectual, as physical, to be achieved by the power of association and co-operation.

We sometimes hear complaints that good honest work is more rare than formerly in this country, but this can scarcely be admitted.

Thousands now demand to be supplied with articles for which hundreds were lately the customers. The few good things are still to be obtained, but they are merged in the sea of mediocrity, and the rising value of labour, in the present day, makes good work more and more costly.

Nevertheless, it must not be readily conceded that man cannot do now, what he once did; for, to grant this, would be to deprive us of all heart in our work. We must, as architects, accept the conditions under which our exertions are possible, and however dispiriting the aspect of things external may at times appear, we may be sure there is a task for us to do, if we will but seek it, and that, seeking it, we shall find great objects to accomplish, and "good in everything."

Assuming, therefore, that large towns are a necessary concomitant of modern civilisation, what can architecture do for us in respect of them? Let us consider this.

In a simpler state of society, the duties of the architect were necessarily simpler also. He had space and labour more at his command than at present. The urgent demands of sanitary science did not perplex him. He was more able to devote himself unreservedly to the æsthetic side of his calling.

The traffic in the streets gave him little trouble in laying out the general plan of a town, if he were called on to do so, and he had definite traditions on which to proceed. With us, it has become a necessity for the architect to combine with his art no inconsiderable amount of science, to guide him in the constructive, or engineering portion of his duties.

The great architectural monuments of the past have been for the most part the work of the enlightened few,—the rich and powerful who pressed architecture into their service. For their purposes, grandeur was everything, and the beauties of architecture were valued by them, as adding a fresh glory to their magnificence. The poor might live in hovels, but there must be splendid palaces, and stately temples. We have now to take into account a different state of things. Great opportunities may hereafter occasionally arise for the architect; but, for the most part, he must prepare himself to take advantage of more numerous opportunities of smaller things; and in these architecture will have to justify herself by combining beauty of art with a full recognition of utility.

Some have considered that there should be a complete separation between the æsthetic and scientific branches of our art. The adoption of this theory would lead to the employment, on each architectural work, of two authorities; and there would be no small risk of the dangers which wait on divided counsels. There would also, I think, be a tendency on the part of the architect, no longer controlled by constructional necessities, to drift into a dreamy unreality opposed to the practical character of good architecture.

We need not dwell much upon the other aspect of this question, for our engineers have too often considered themselves free to disregard beauty, and we know the result.

Some have proposed, as you are aware, that everything be left to the individual workmen, on the principle, I suppose, that out of chaos order must of necessity spring. I need not trouble you now with this theory, as it has recently been discussed, and found inadmissible.

I do not think it would be a hopeful plan to release the architect from his constructional responsibilities, and it appears to me that the severance of architecture from engineering has been an artistic misfortune. It was not always so. The appearance of our public works was thought of, as well as their utility, in days not long gone by.

You remember, I dare say, the discussions which arose last autumn about widening London Bridge. I must not plunge with you into the controversies which that discussion aroused, but I may notice in passing that each party to it expressed a high admiration for the design of the existing bridge. This was the work of Rennie, a distinguished engineer, and one not blind to architectural beauty. Now, a bridge is primarily a utilitarian structure, but you may see, by this instance, that for such works there is scope for architectural art.

When it was built iron was far from being as familiar to our constructors as a building material as it is at present, and, if we are to judge by recent practice, the days of stone bridges of large span are gone. We have seen Westminster and Blackfriars Bridges constructed of iron, and the railway engineers have adopted the same material for similar structures.

However we may raise the question of respect for the work of Rennie, there is no doubt that those who lately proposed to use the readiest means of enlarging the bridge were but following the traditions of Mediæval times, when each new style turned impatiently from its predecessor, and Norman masonry was concealed without a scruple behind casings of later work. There can be little doubt that a Mediæval architect, engaged on a work which was mainly one of utility, would have used, as a matter of course, such materials as appeared to him most suitable and economical for the purpose in hand.

It is satisfactory to note the enthusiasm for the design of London Bridge, latent though it may long have been. Any such manifestation of public interest in our architecture is most welcome to the artist; but, while it is not desirable to discuss the merits of a contemporary design, it is allowable to point out that a respect for a work of yesterday may be pushed too far, if it is considered to forbid the application to purposes of public convenience, of the increased scientific knowledge which time has brought with it. Our interest in the art of the past, gains much from our conviction that it was perfectly truthful, and that we may rely upon it as a complete exemplification of the practice and skill of the day. If our work is ever to be regarded with similar interest in the future, it must be founded upon similar principles.

As affecting the question of the separation of the architect's duty into two independent parts, it should not be forgotten that our greatest public works are likely to possess more or less of a utilitarian character. With the increased influence of the many on public affairs, we may expect to see greater attention paid to problems hitherto more or less neglected. The time is past when the State was the only patron of art, and employed it to minister to its own magnificence.

If you will recall to your memory some of the principal London improvements of the last few years, you will understand my meaning. With the exception of some few public buildings, almost all the works of our time which have left an enduring mark on the face of the metropolis have been carried out by associations and companies, distinct from the Imperial Government.

We have been speaking about bridges. Of those over the Thames, I think Westminster Bridge is the only contribution of the State; Blackfriars Bridge has been rebuilt by the Corporation of London, and numerous iron bridges have been constructed by the railway companies. The Thames Embankment has been carried out by the Metropolitan Board of Works, who have also given us some valuable street improvements, besides a new system of drainage.

In these great undertakings, there has been scope for architectural art far wider, and more important, than private patrons could give. We have, all of us, an interest that considerations of artistic effect should not be merged in utilitarian exigencies. If the architect, as an artist, is to be separated from the architect as a constructor, I very much fear that it is the former who would go to the wall. To avoid this misfortune, I should deprecate a policy which might lead to so unfortunate a conclusion.

It does not, of course, follow that an architect must, of necessity, be as great a master of all the newest modes of construction as an engineer now claims to be. The applications of special science are so varied and extensive, that we must, of necessity, have need of experts to be called to our aid, as extraordinary circumstances may require.

It is a mistake to suppose that anything is so entirely utilitarian in its purpose that appearances may be neglected. Even sewer works require buildings and tower-like chimneys, which become landmarks. Our waterworks, beside similar requirements, may exercise the taste of their architect in bridges, enclosures, and the like. Railway stations may ornament or disfigure the quarter in which they are placed. River embankments give abundant opportunities to the architect, not only with regard to their own details, but also as to the larger question of building along their quays, and laying out the adjacent grounds to the greatest advantage.

In the interest of art, we must not surrender all those opportunities. The public mind is, I think, more alive to them than it has been, and it is to be hoped that its interest will thrive, and strengthen.

For the architect to be able to claim and occupy his proper position, he must be prepared to link himself heartily with the improver. A mere dilettante application of favourite details will not be enough; he must enter into the spirit of the work to be done, and must be prepared to submit his ideas to the arbitrament of reason. Far from thinking there is any degradation of his art in such a course, he will have the happiness of feeling that he is assisting her to claim her highest glory, that of ministering to the public good.

We conclude, therefore, that the architect should remain, as he always has been, an artist and a constructor; that his mission is to design with beauty,—to build with truth. If he can do these, he will find plenty of room for the exercise of his powers, even in these days, so often described as purely utilitarian.

If allowed to advise from the first, he might prevent many an error, found afterwards (and too late) to be irremediable. The planning of new streets, for example, is a matter of the greatest importance. The best laid-out thoroughfares in London are no doubt Regent-street and its accessories. They are well worthy of your consideration as you walk along them, from Charing-cross to Portland-place. They were of course designed before the traffic had become what it now is. The architecture of the houses is not in accordance with prevailing taste; but I am not asking you either to admire or criticise it. I do wish, however, to call your attention to the care and design shown by the general scheme, and we may remember, with some satisfaction, that it was the work of an architect.

You may easily point a contrast if you will examine some more recent examples of new streets, with their unpleasant angles and unstudied curves. Such streets may be convenient, but they will never add to the beauty of our cities.

In connexion with streets, we naturally think of the squares and open places to which they lead. In their arrangement and adornment, the architect may do much. No doubt the most agreeable sight to the urban pedestrian is verdure and flowers, rather than formal architecture, but some formality is called for by the necessities of the case, and it may be effectively treated in various ways. I should be glad to see more of our open spaces planted than is now the case; Trafalgar-square, for example, where turf, evergreens, and flowers, might encircle the fountains, and advantageously replace the dusty and heating asphalte. I think it was the late Professor Cockerell who pointed out that in arranging the streets leading to a square, it was better to let them enter the square a little way from the corners rather than at the corners themselves. In the former case, the trees and shrubs in the square garden would be visible from the streets, and would form a pleasing break to the formal monotony, which the other arrangement involves.

As to the height and sky-line of buildings also, architectural influence should be exerted. Some regulation seems to be called for as regards this important point, or I much fear we may drift into anarchy, from the present rage for lofty buildings. I cannot doubt that the healthiness of London, as compared with some other cities, has been much promoted by the circumstance, that its buildings are, as a rule, of moderate height. If every one is to be at liberty to make of his house a Tower of Babel, it is much to be feared that the evils he may cause, will not be architectural only.

The proper assignment of sites for our churches, theatres, and other public buildings, has also to be studied. These should be isolated, and so placed as to command important thoroughfares. The width of streets and their gradients are all questions in which architects are interested. Precautions against fire, and the important problems of construction raised by them, must not be neglected, while the urgency of sanitary requirements which affect our architecture becomes daily more pressing.

Now I claim for architects, as artists, an influence in the solution of all those questions. A building may be beautiful in itself, and, nevertheless, a failure, as to its effect, if it be badly placed, either by reason of its own site being unsuitable, or by the extravagant height or design of its neighbours. In the country, these matters may perhaps be left to themselves, but in towns, a certain amount of regulation is called for by the public interest. In respect of such regulation, the architect has a right to speak.

All the above subjects, besides others which will readily occur to you, affect, more or less, the

conditions under which our art can be exercised. To determine them rightly, we must bring to their consideration a fair and candid recognition of the circumstances of each case, and a hearty sympathy with the work to be accomplished.

The chief difficulties of the architect in dealing with the great mass of everyday work must always be financial, for, unfortunately for him, his art requires outlay, more or less considerable. As a consequence of this, there is always too much of a disposition to regard architecture, as a luxury of the few. Against this tendency I protest. There is no satisfaction in accepting a position for our art, so unworthy of her claims to instruct and gratify nations.

If, therefore, I am right in the view I have taken, we have to consider the tendencies of our times, as they must affect our practice of architecture; for if we either neglect them, or place ourselves in needless opposition to them, we shall but beat the air, and the result must be the annihilation of the architect as an artist. We have been warned by no less an authority than the late Prime Minister, that the great deficiency of our technical education, is a want of recognition of the claims of beauty. He has also pointed out the great changes now in progress in the value of labour. Our artisans, working with their hands, are daily bettering their condition. Our clerks, with their more or less intellectual labour, find themselves in danger of being left behind.

It is clear to me that architecture can never be regarded in a higher sense than that of one of the many indulgences of the rich, unless she can address herself to the masses, and interest them in her work. How this is to be effected is the problem of the day. If the great artisan class of our country be really advancing in social condition and power, is it too much to hope that with more leisure and increased education, will arise that love of beauty and art, of which Mr. Gladstone has spoken?

I know there are those who laugh to scorn such suggestions, and declare that more prosperity means more idleness, and more wages mean more beer. I must decline, however, to accept such pessimist views. I have confidence in my countrymen, and am persuaded that they will know how to profit by the great opportunities which are now presenting themselves.

But, it may be said, this is all very well, but "Englishmen have no taste. The Latin race will always beat the Saxon in artistic aptitude." This is a view which, in its superficial aspect, has much plausibility. In some of the applied arts, our workmen have certainly been distanced, though even in these, they have of late years done much to lessen their inferiority. It should be borne in mind, however, that while foreign Governments have wisely thought it one of their most important duties to foster art, we in England have almost prided ourselves on a neglect, which many of our most thoughtful statesmen now deplore.

But if in some instances, we must admit deficiencies, and strain every nerve to supply them, I cannot allow that in architectural skill the Englishman has always shown himself inferior to his continental rivals.

I am not speaking of the work of to-day. To do so would plunge us into a sea of divergent criticism, and raise that bugbear of our art,—the "Eastern Question" of architecture,—the battle of the styles. I must contend, however, that there is nothing in our ancient architecture to allow us to accept a position of inferiority to other nations. Our cathedrals may be more contracted, and display some insular peculiarities (such as, for example, the small size of their doors), but they are as beautiful, both in construction and detail, as their continental rivals. Our village churches are unrivalled, and we know from the fragments of domestic work which remain to us, how fully beauty entered into the every-day work of our forefathers.

I see no reason, therefore, to charge any of our difficulties on inherent artistic deficiencies.

We know "how oft the sight of means to do ill deeds makes ill deeds done," and the artistic sense soon becomes dull and weak in the presence of ugliness. Can we, therefore, who know the surrounding circumstances of the homes of the great majority of the population, wonder if there is need of the warning that beauty and science should dwell together?

Depend upon it, there is no reform of so pressing an importance in our day as the improvement of the homes of the million, and this is a question in the solution of which architecture should have her share. The rapid rise of various great industries, and the development of mineral wealth, has congregated great masses together, with but little provision for moral or physical improvement. Other causes, no less potent, have affected the country homes of the labourers. Let us hope that this rich and powerful country will be able to rid herself of the reproach that a majority of her sons are unable to house themselves with comfort, or even with decency.

If our artisan class be, as I believe them to be, as intelligent as any in the world, it is for them to look to this. With increased wages, they are daily gaining power for social improvement, and will have less and less necessity for reliance on others. The pinch of the present state of affairs is felt, as Mr. Gladstone has said, by others rather than by them. All the circumstances of the day are in their favour. The Legislature has lately given compulsory powers to their representatives for the purchase of sites, and the burden of educating their children is shared to a large extent by others. I should regard it as a most hopeful sign if we could see the great trade societies of our various industries uniting to answer the important inquiry of how to provide healthy, and I will add beautiful, homes for the people.

I feel sure that, until this be done, our hopes of any great artistic advance among our workmen will be doomed to disappointment; for the eye which is debased by dirt and squalidness at home, cannot shake off such depressing influences on its daily work.

I do not, moreover, see why such improved homes, as I have been speaking of, should be destitute of the graces of art, and I hope architects will not allow this to be the case. The artisan class, as a whole, is well able to pay for what it requires, and a taste, once implanted, is not easily eradicated. With the wants of the improvident and hopeless poor, who form so sad an element in the society of our large towns, I cannot deal here. It seems a cruel mockery to speak of architecture to classes whose first needs are those which spring from hunger and nakedness. This grave question is one for charity and well-considered benevolence to grapple with. It is not one to be profitably discussed here. The provision of healthy and artistic houses for our artisans is, however, a question with which society should be competent to deal, now that so many difficulties have been removed.

There can be no reason why these improvements should be of an eleemosynary character, or that the necessary arrangements should be so pared down that the new buildings should resemble prisons or union workhouses; without one sign of that homeliness which we all desire in our own houses. By the combination of many dwellings under one roof, or in large blocks, architecture may contrive to obtain beauties which would be unattainable on a smaller scale, besides being too costly for general adoption.

I have spoken thus far of artisans, who may be roughly described as those who live by skilled manual labour. To them it only seems now necessary to speak of self-reliance and self-help. The rich can of course take good care of themselves, and make their influence felt in the architecture of our cities. There is, however, the great middle-class between these two, and it is in the attempts to supply the wants of its lower section that many difficulties will be found.

A rising labour-market means to this class dearer houses; becoming every day more cramped and depressing, in dull and monotonous ugliness. With ever-increasing anxieties in the battle of life, its little elegancies give way before the more imperative calls of necessity, and an impetus is given to the production of all those shams, and cheap finery, which seek to pass off dross for gold.

How will all this affect our architecture? I fear that there is but one possible answer, if things are to remain as they are.

Much has been said of the advantages, to the householder of moderate means, of having his dwellings constructed in flats, in large buildings. Hitherto, however, little has been done in this direction, except for the two classes, at either end of our social system. The experiment of such buildings for those of whom I am now speaking, has yet to be tried, at least upon any large and sufficient scale.

Accustomed as we are to a different system, the change is difficult, and attended with some disadvantages, which it is needless to dissemble. There are doubtless some objections to the flat system, such as its defective privacy, and compulsory association, to a greater or less degree, of possibly discordant elements. But it may be pointed out that in the principle of association is almost the only hope of those whose wants we are now considering.

Other circumstances being equal, a combined dwelling must offer economical and other advantages, which are becoming daily more difficult to obtain under the separate system.

To architects belongs especially the study of this question, and I commend it therefore to your notice. The same principle of co-operation which has given us our palatial clubs, and which, still more recently, has cheapened to thousands, the price of the necessaries, and elegancies of life, must, as it seems to me, be, sooner or later, applied to our dwellings. The prospect is not without hope for the architect, and I advise him to qualify himself betimes for dealing with it.

We have seen a remarkable revival among our cultured classes for music and art. Never before have pictures, porcelain, or other artistic productions been more appreciated. Let us hope that our revival of architecture will not spend itself in our palaces and public buildings, but that it may extend to the homes of the poor, and the thousand wants of every-day life.

And now it is time to bring to an end, this, I fear, too discursive lecture. Let us recall the conclusions at which we have arrived. First, we have seen that we may go to nature for inspiration, not to carry out direct imitation, but to study her principles, and modes of action. Let us ponder well on the mingled beauty and utility of her simplest productions. Let us learn from her simplicity and truthfulness. Armed with these principles, we are to apply them to the practice of our art. We are not to seek to astonish by eccentricities; but, on the contrary, are to proceed to solve the problems submitted to us, with a taste chastened, and controlled, by common sense.

Having so prepared ourselves, we have to apply our knowledge for the good of others. If architecture, as an artificial art, leads us into the midst of great cities, with their often depressing associations, it is our duty to study carefully the conditions under which our art becomes available. We may often find at work, below the surface, causes of action, at first sight, little expected, but against which, no efforts of ours will prevail. In such cases, we may guide, where we cannot drive, and may make the refining influence of art felt, in movements, which owe their origin to social causes, far beyond our control.

If such things are difficult, that is only a reason for unflagging exertions. The architect must not give up a question because it is not easy to solve it, any more than a soldier may desert his post. His influence, properly exerted, will readily increase, and will spread upwards, as well as downwards. To render it effective, it is necessary to unite science with art, so that every one may be convinced, that in seeking the graces of the one, he will not be called upon to surrender the solid advantages of the other. The architect must be chary of declaring that the requirements of convenience are not to be satisfied, out of regard to æsthetic considerations, he must rather consider it his task, to reconcile the one, with the other.

In our large towns, we have seen that he may find scope for his art in many ways,—in laying out streets, devising improvements, and constructing bridges, as well as in planning separate structures. In his designs for the dwellings of all classes, he must keep steadily in view, the requirements, and circumstances of those who will be their inmates, and it must be his pride, not to force their habits into unison with his preconceived ideas of architectural propriety, but rather to apply his art to their necessities, and add a beauty to the exigencies of utility.

So shall architecture remain a living art, "a thing of beauty, and a joy for ever," the chosen companion of science, the handmaid of religion, and the pioneer of the social, and moral improvement of the people.

A Great Canal.—A writer in *Labour News* says,—Various provincial chambers of commerce have been communicating with each other with a view to electing a committee or syndicate to superintend and ensure the simultaneous improvements of the Rhone, the Yonne, the Seine, and the Bourgandy canal. To realise so vast an enterprise the Chambers of Commerce would advance 2,600,000*l.* to the State, and thus ensure in the course of about seven years a magnificent water-course, accessible even to large ships, and uniting the Northern seas with the Mediterranean!

THE SHAKSPEARE MEMORIAL COMPETITION AT STRATFORD-ON-AVON.

STRATFORD-ON-AVON has no theatre. Carefully as every memorial of the great name of English drama is cherished there, the works of Shakspeare cannot at present be performed in his native town, except by special provision at occasional festivals. The small theatre which did exist was removed some time since in the course of alterations in sites and property. The proposal to build a new theatre, arising perhaps out of the feeling that Stratford-on-Avon, of all places, ought not to move backward in theatrical matters, has developed into the idea of a central Shakspeare memorial edifice, comprising in one building or group of buildings a theatre, a library, and a picture gallery, and occupying a site by the river, of which the part not taken up by the building is to be laid out as a garden. The committee formed to carry out the scheme advertised, in the first instance, for small sketches only to be submitted by architects in competition, of which a certain number were to be selected, and the authors of them requested to prepare more complete schemes on fresh instructions and under new mottoes; the author of the design selected in the second competition to carry out the building, and the remaining candidates to be paid 25*l.* each for their work. Twenty-five sets of sketch-designs have been sent in, which have been exhibited in the Stratford Town-hall this week, and from which five have been selected for the further trial of strength. These five we proceed to notice in the first instance; premising that the sum proposed to be spent on the whole was from 8,000*l.* to 10,000*l.*; that it was required that the building should "front all round," or be equally presentable on every side; that it should be capable of further embellishment by the addition of sculpture or other ornamental adjuncts beyond the limits of the specified sum, but that the design should, nevertheless, appear architecturally complete without this; and that the whole should be so planned that it should be practicable to build the theatre first and add the other rooms afterwards; it being also thought desirable to keep these latter as separate as possible from the theatre in consideration of the chance of fire. The auditorium of the theatre was required to seat 700 persons, every one of whom is to have a good view of the stage, and provision was to be made, as far as possible, for shutting off a part of the auditorium by temporary screens, so as to prevent a desolate appearance of bareness and emptiness on occasions when only a small attendance was to be provided for. The first plan we light on is that entitled

"Merchant of Venice." In plan the auditorium is a circle internally, with a dome and lantern over, but a square externally; the line of the box front, with a double ogee curve, concave in centre, and convex to right and left, projecting, to our thinking, rather too far into the house. The proscenium opening is 23 ft. in width, and the stage 40 ft. from back to front: this is about the same width as most of the competitors have taken; but the depth of stage varies very considerably in the different schemes. The provision for access and entrance is on a liberal scale, including an entrance vestibule, with *foyer* and open loggia over, stretching narthex-wise right across the front, with staircase turrets at each extremity. Actors' dressing-rooms are provided below the stage level; the accommodation not shown in detail, but there is plenty of space. The library and picture-gallery are placed symmetrically, to right and left of the auditorium, so that the whole, with the stage and entrances, forms a tolerably regular Greek cross. The square form is not the best for a picture-gallery, and a more serious objection is, that the toplight of the gallery will be overshadowed by the higher roof of the theatre adjacent,—a consideration very frequently overlooked in placing picture galleries that are to be lighted from above. They should, in such a case, be where no other building can cast a shadow over them. As the gallery and library abut against the theatre for the whole length of one side, the appearance of the theatre, if built first, will be very unsightly, with the bare party-walls left waiting for the additions. As may be supposed from his title, the author aims at a Venetian-Gothic character (scarcely in place in Stratford), though there is a good deal of French feeling in details. Very extensive use is made of sculpture, and the elevation, as sketched in, is picturesque in general character, and refined in feeling; but it is a costly design, and without the sculpture would be absolutely nothing, or next to nothing; and there are features added, for the sake of skyline, which are the merest "constructed decoration," the centre pedimental erection over the loggia not even having any obvious pretext or means of support on the plan (we presume at least, from the tinting, that it comes over the loggia). The stone drum of the large lantern looks by no means secure on the ring of the dome, unless the latter were strongly "chained" between that point and the springing; but all this would have to be modified very much in execution, and we question the result of the domical form acoustically. Curtains are proposed to shut off the extra seats, and make a small house; most of the competitors propose curtains for this purpose. Upholstery tends to make a very "dead" house to speak in, however. The author puts his design at 11,000*l.* for the whole, and 6,500*l.* for the theatre. Both amounts seem understated; so much money is run away with in the entrances.

"What here shall miss our toil shall strive to mend." A most complete contrast to the last-named. The style is thirteenth-century Gothic of a simple and severe type; there are no *made* ornamental features of any kind, the effect being got simply by the general mass, by the character of the walling, and the fenestration. The circle of the back of the auditorium is frankly displayed in the external wall (an unusual point in a theatre design, but surely the most logical treatment), which is solidly built of partially irregular masonry, apparently, with string-courses of squared work; a heavy cornice, corbelled out in three or four courses, caps the walling, and forms the base to a high conical timber roof, with a wooden lantern. The centre doorway to the auditorium is so arranged in regard to the interior that it can be used as the only door when the theatre is used for a general audience at a concert or lecture, and distinction of stalls and pit abolished. The construction of the timber roof is satisfactorily indicated. The author has the sense to see that if a building is to be capable of being erected in two parts, the smaller the point of contact between those parts the better: accordingly he bridges off his library and picture-gallery into a separate parallelogram at right angles to the theatre; a stone arch, which also serves as a carriage-porch, carries a timber gallery and staircase, connecting the stalls lobby directly with the picture-gallery. This gallery of communication is capable of improvement; the part of it containing the staircase clings awkwardly on to the picture-gallery wall. The subsidiary building is well treated; the library below with large windows, the picture-gallery above lighted from the top, and with large wall-arches forming frames for pictorial designs in mosaic. The defects of the design are that it is somewhat too severe and unfestive-looking in the theatre portion; that the penthouse roof which acts as porch over the centre entrance at the back of the auditorium has a mean and patched-on appearance; that the dressing-rooms on each side of the stage come too near the line of sight from the house and leave too little room in the wings; and that there is too much high unbroken mass of slate roof over both sections of the building. All these defects can be remedied without interfering with the main character of the design. It is, however, more than a question whether a Shakspearian theatre should go back for its architecture to a date long prior to that of Shakspeare. The merits of the design are that its treatment is solid and unpretentious; that there is not a single built-up or sham feature; that the whole design tells its tale and accords with its plan completely; that the plan is in the main a good one; and that, in spite of some rudeness and roughness of manner about it, the building is monumental in character and conceived in a true architectural spirit. Moreover, it can be built for the money.

"Are we all Met?" shows a beautiful set of drawings, which can hardly be called "sketches," being in fact about as highly finished as any drawings need be. The plan has admirable features. The picture-gallery building and the theatre are arranged in longitudinal fashion, end to end, connected by a vestibule or passage, which is entered from the side by the principal entrance, and then communicates to the right with the gallery, to the left with the main theatre-lobby and box-staircase. The auditorium of the theatre takes the form of a tolerably long ellipse externally, and internally that of a circle, the spandrel space between the boundaries of the circle and ellipse, at the side next the main entrance, being used for approaches and staircases, which are very cleverly planned here The defect is the stage, which is far too small in every way; it has no height over (the author suggesting the use of rolled scenes entirely), and no sufficient depth for effect. The design is Jacobean, with just a reminiscence of Elizabethan in the mullioned windows, for the theatre, and Elizabethan for the library building; the latter, with its large florid curved gables, scarcely harmonises with the more Classic aspect of the auditorium, with its flat domical roof and heavy coupled wall columns, which seems to be in its general idea a reminiscence of the Radcliffe Library. The materials shown are red brick, with heavy and costly stone dressings. The style is very ably treated, but the stage portion should have been combined more carefully and systematically with the auditorium, by continuing some of the string-courses through. The author knows that his design is expensive, and puts the whole at 15,000*l.*, and the theatre at 10,500*l.* We should doubt his getting any good contractor to take it at those amounts.

"Our Will." This is a very compact and well-arranged plan, with, however, the disadvantage that the library building is so closely united with the theatre that the building of the two separately is rendered much more difficult than need be. The plan presents no very special point. The design is French Renaissance, and is intended to be carried out, the author tells us, in local brick with stone dressings, the ornament being chiefly supplied by *sgraffito*. It is a style, however, that will not look well in that way of execution, which, moreover, will save little; for it is apparent, from the indications both of elevations and perspective view, that, after all, a great proportion of it must be stone, and the basement story seems to be entirely so, if tint and drawing mean anything. Architecturally the design is a falsity, for it treats the picture-gallery building and the stage building, at opposite ends of the centre block of the auditorium, in an identical manner, though no two structures could well differ more in their character and arrangement. On the whole, with some good points, this is a draughtsman's rather than an architect's design.

"Saint Valentin." The author has arranged the whole of the buildings in one longitudinal block, the length being broken, however, by projections at each end and near the centre, marking the cross blocks of the plan which contain, at one end the dressing-rooms, &c., behind the stage, at the other end the grand vestibule, and in the middle block the intermediate vestibule and staircase-hall between library and theatre. The plan is on a large scale in comparison with others, and is very symmetrically arranged, but has no special merit to recommend it, and the author has been so desirous of producing internal effect that he has swallowed up all the best part of his library building in a grand staircase, the library being arranged round the staircase-hall, and the reading-rooms are only two small insignificant rooms (one of them only 13 ft. by 13 ft.) cornered off where they can be spared from the show part. Such an arrangement is equally at variance with common sense and comfort. Externally the building is in that very unrefined modern brick Gothic style, the distinguishing brand of which is the arrangement of parti-coloured voussoirs so as to give the line of a round arch on the soffit and of a pointed arch above. The whole suggests a hotel, what would be the windows (in the theatre portion) being filled in with statuary and mosaic. Apart from whatever effect may be got from these, there is not an architectural feature to commend in the exterior, and as the plan is both unpractical and costly, we are completely at a loss to understand on what grounds this design was selected. The committee reserved the power to call in a professional assessor; and though, judging from the choice of the other designs, and from what we had the pleasure of ascertaining more directly as to the spirit in which the matter is being carried on, we think the Stratford Committee seem to know much better what they are about than competition committees generally do, they certainly wanted a little better advice in this case.

Turning to the designs not selected, we must especially mention one marked "Love's Labour Lost," which is in some respects the most original, as it is certainly one of the most meritorious designs in the room. One special point of the plan is that the circular line of the auditorium is carried out externally, a feature which it has in common with "What here shall miss";

but around this again is carried a broad aisle, divided partly into sections by internal buttresses, with a central feature something like a tri-apsidal or *chevet* plan, and this aisle is made a library on one side and a museum on the other, the bookshelves being arranged against each side of the internal buttresses. The whole forms a wide gallery round the theatre, like a very spacious box lobby, in direct communication with the auditorium, and communicating at one end with the entrance-hall, and at the other end with the reading-room, which is a very quiet, retired apartment. The plan is simple, practical, and effective, and the unity of the whole idea internally and externally strikes one as most satisfactory, and conceived in a true architectural spirit. The exterior is shown in two slight but nicely-drawn pencil perspectives. The author adopts Tudor Gothic as the architecture which Shakspeare probably liked and had most associations with, as he thinks the poet would probably have disliked the Renaissance revival, much as many now dislike the Gothic revival. The principal entrance is a double porch, called "Queen Elizabeth's porch," and "Queen Victoria's porch," distinguished by "E. R." and "V. R.," and with the figure of Shakspeare between. The only blemish of the design in regard to detail is in the wretchedly small attenuated buttresses; they should either be much more massive or be omitted altogether; and the author has either not seen the site, or shirked a difficulty in attempting no architectural treatment of the rear or stage side; this, indeed, he is quite aware is the defect of his design, and has adroitly turned his two perspectives so as not to show it. But the general style of treatment is in excellent taste, and in fact, on first looking round, we at once picked this out as the design which best suited the place and occasion, in style and feeling, and were quite surprised on returning to it to find no "selected" ticket on it. Now the committee (if we rightly understand their "Instructions") undertook to select not less than five, nor more than ten designs; they are therefore not tied against selecting another, and we do strongly recommend them to give the author of this clever and original sketch the option of showing what he can do with his idea on further working out. To put such a design as "Saint Valentin," before "Love's Labour lost" was deplorable, and really almost an insult to the author of the latter.

Among the others, "A Deed without a Name" is a most elaborate and beautifully-drawn French Gothic design, twice too large and totally unsuitable to the occasion. The author says in his report that he does not pretend to offer a design at the cost named, but "will be happy to give that point his careful consideration," if his design is selected. That is, he has endeavoured to captivate the committee and take an unfair advantage of other competitors, by showing a fine set of drawings which he knows are far away beyond the mark, and persuading the judges to overlook the fact. This is the standard of competition honesty; but a committee would indeed be "green" to be taken in by it in this case. "As you like it" is, architecturally, one of the best designs here, Classic in general character, with Gothic feeling in detail; the building is effectively grouped, and the different portions distinguished by characteristic treatment. It is quite beyond the mark as to expenditure, but the author deserves a word in recognition of his admirable drawing and clever design. The set of drawings by "Avon" shows a design in modern French Renaissance of great excellence in many ways, in drawing and grouping, but almost palatial in character. It is to the credit of the Stratford committee that though, as we have said, they have made one mistake, they have apparently kept strictly by their conditions in forming a judgment, and have not allowed themselves to be led away by pretty or ambitious drawings.

There is some talk of exhibiting the selected designs in London, by way, we suppose, of exciting a little more general interest in the undertaking. As to the general scheme, we confess to having our doubts whether anything like a theatrical training-school, which is part of the object, would answer so far from London, or whether persons wishing to educate themselves for the higher walks of the actor's art would go and live at Stratford to do so, merely as a matter of sentiment (which is what it really comes to). But we see no reason why Stratford, especially with its summer assemblage of Shaksperian pilgrims, should not support a theatre; and that being resolved upon, it seems a most natural and suitable thing to take the opportunity of making the building a kind of central Shakspeare memorial, and furnishing the opportunity for collecting within the same walls whatever of interest can be brought together in reference to the history of the poet and the illustration of his works; and towards such an object we should hope many beyond the neighbourhood of Stratford would be willing to contribute.

One cannot be expected to say anything new about the Shakspeare relics of the place, but a visit to the church suggests the remark that there is a new Shakspeare tribute in progress there, consisting of a stained window, containing illustrations of the "Seven ages of man" by incidents in Scripture history, and which is being put in entirely from the subscriptions of Americans, who, as the kindly and intelligent custodian of the Shakspeare house tells us, are among the most numerous and enthusiastic visitors to the shrine.

ANNALS OF THE CONGRESS OF FRENCH ARCHITECTS.

THE report of the first Congress of French Architects comes to us rather late in the day, seeing that the Congress sat in 1873. Our neighbours take time over these matters; but they do the thing well, and nothing could be neater and more business-like than the admirably printed volume,* with its wide margins and grey cover, which gives us the record of the subjects treated of on that occasion, together with a memoir and portrait of M. Victor Baltard, the president of the first Congress, whose decease has intervened between the sitting of the Congress and the publication of its memoirs.

Of course the "Annales" is preceded by an "Introduction," giving a philosophical view of the subject of conferences, and their aims and uses; for without such a commencement it would not be French. "L'œuvre de l'homme n'est durable qu'a la condition d'emprunter à la nature quelqu'une de ses lois. Particulièrement, toute association d'individus doit être organisée en quelque sorte comme l'individu lui-même." So M. Paul Sedille, "secrétaire-adjoint" to the Conference, commences his introductory essay. We seem to have got a little past this in England, and do not think it necessary to prove the philosophical right or advantage of a meeting of professional men, before proceeding to business. However, if the French generalise rather too much and too inevitably, it may be admitted that on this side of the Channel there is somewhat of a deficiency in the opposite direction, and it is not a bad reminder sometimes to be taken back for a minute to first principles. M. Sedille sketches the history of the "Société Centrale," which he represents as arising out of a general movement in France about 1840, towards new literary and artistic ideas; a movement which drew together more than before the separate representatives of the architectural profession, not only with the view of illustrating more effectually their love of art, but also "*d'honorer la profession par des gages de mutuelle estime.*" This latter aspiration commonly has something to do with the foundation of professional societies, but it is, if one may judge from experience, a sentiment subject to decline without careful nurture. With some people, at least, the notion of honouring the profession seems to be connected with any feeling rather than that of "mutual esteem," and the greatest enthusiasts (according to their own account) for architecture are the greatest detractors of all architects, save themselves. Let us hope history will not repeat itself, in this respect at least, in the "Société Centrale," in which at present, if we may judge from these Annals, there seems certainly to be a very general and prevalent cordiality of feeling.

The Société seems to have devoted itself very much from the first to matters connected with the legal and business part of the profession; reforms in which can only, in fact, be carried out by united action. The publication of a *Manuel des Lois du Bâtiment*,† some twelve or fifteen years since, was one of the important acts of its earlier career. It was some time subsequent to this, not indeed till three or four years back, that the idea of realising the epithet "centrale," by extending the connexions of the Société in Paris with the representatives of the profession in the departments, was taken up and acted upon, resulting in the series of meetings in the chemical lecture-room of the École des Beaux-Arts, where the first conference held its session, of which we have here the detailed report.

Portions of the short and practical opening address of the President might have an application beyond the immediate circle of the audience who listened to it. After remarking that in after-days, as well as in youth, we feel the necessity of mutual support, together with the added duty of giving assistance to those who are commencing the profession, M. Baltard went on to say that if they had one regret, it was that their society (comprising 250 members) was not more numerous, although their brethren who were not on its list often addressed them with inquiries or consultations on some matter of interest in professional practice. "We willingly answer them, and do not bargain about the advice which may be useful to them; but our *confrères* might do much better by placing themselves permanently in community with us, taking part in our work, and giving in their turn counsel and instruction,—in a word, paying us in person. They would contribute thus to the soundness and sureness of the advice given in their own interests." In commenting on the existence of similar professional unions in other countries, the President observed that in America there was a peculiar feature in the constitution of architectural intercommunication, in that certain towns, having a relative importance beyond that of any provincial towns in France (such as Boston, Washington, Baltimore), were made successively the centres for re-unions of architects from other towns; adding, "I believe it is the same in England." M. Baltard was probably misled in regard to this latter point by our having the proposition for such a scheme of provincial gatherings so often mentioned in England. In America the thing is done, apparently; in England it is only talked about: a preliminary measure in which we are very proficient in this country, but which seldom seems to lead to any ultimate results.

The Presidential address is followed by what would be for those present certainly one of the most important, as it is, in a general way, among the ablest and most elaborate papers, in the volume,—that by M. Hermant, on the legal responsibility of the architect. This, however, is only of interest to English professional readers as far as regards the exposition of general principles of professional equity involved in it; for the main object of the essay was to clear away the confusion existing in the relations of the French architects with courts of law, arising from the fact that in the legal code of France *architecte* and *entrepreneur* (contractor) are synonymous and interchangeable terms. M. Hermant's essay is largely occupied with citations from the statutes, and from what we should call in England "leading cases," to instance the confusion of legal responsibility thus induced, and which, in theory, at all events, appears to be about as complete as it well could be. In the course of his argument the lecturer explained the origin of this confusion of persons, as arising from the fact that in former days the architect not unfrequently did undertake, commercially, for the production of the materials and the execution of the work, and that thus, at the time when some of the statutes and precedents complained of came into existence, the two titles were really, to the legislators, synonymous. This admission, however, is not to be taken as an argument in favour of "the inspired workman," for M. Hermant describes the architect, in the cases referred to, as the person "*qui avait dressé les plans,*" and who was only requested to undertake a contract after that operation had been completed. The second portion of M. Hermant's paper, in which he applies the deductions from his previous reasoning to the question of the responsibility of the modern architect, is of more general interest. He distinguishes between the architect as an artist, or a dealer in something which he supplies (*locateur*), and as an agent (*mandataire*). When the architect acts only as an artist, that is to say, makes the design for a building, with no question of carrying it out under his own direction, he incurs no responsibility at all. He is no more liable because the person who buys his plan and design is dissatisfied with it than is the painter because the person who has commissioned a picture from him is dissatisfied with it. The

* Société Centrale des Architectes, fondée en 1840,—autorisée en 1843,—déclarée d'utilité publique par décret de 4 Aout, 1875. Annales, 1er volume,—Année 1874. Congrès des Architectes Français, Première Session (1873). Comptes rendus et Mémoires. Paris: Ducher et Cie.

† Manuel des Lois du Bâtiment, élaboré par la Société Centrale des Architectes, suivi du Recueil des Lois, Ordonnances, et Arrêts concernant la Voirie ayant Trait aux Constructions. Paris: 1863.

law is no art critic, and takes no account of any element in the case except the question whether the artist has furnished the work he undertook to furnish. In all such cases, *caveat emptor* is the rule, and the buyer is supposed to be the judge of the artist's power, and whether he is worth his commission. There is only one point in connexion with this position of the architect which need cause any anxiety. A scheme badly conceived may have been carried out by a constructor other than the architect who designed it, and have failed: in that case is not the architect who designed it responsible? Certainly not, says M. Hermant. The purchaser bought the designs with his eyes open, and the original designer may say that had he carried it out himself he would have discovered and rectified its weak point in execution, or have substituted another material. "Un projet et bon ou mauvais; c'est au propriétaire qui l'a commandé qu'il appartient de le juger, de l'accepter, ou le rejeter." The architect, as artist or *locateur*, therefore, need not trouble himself about responsibility. There remained the question of his responsibility as agent or *mandataire*. This part of the subject, however, Mr. Hermant leaves in the main for separate consideration, as too extended and intricate to be treated of at the close of a long essay. His object was to show under what circumstances the architect was responsible, and under what circumstances he was not so; to discriminate between contractor, artist, and agent, or *mandataire*, and to urge that the architect can only be, according to equitable interpretation of the law, responsible, when the works were executed not only from his design, but under his superintendence. Of what nature was this responsibility, and how long it should endure,—whether, like the contractor who worked under him, the architect should be held responsible (as by Article 2,270 of the "Code Civil," the contractor is held) for ten years after the building is completed, or for what other term,—were questions for further consideration. But (and it is to this concluding sentiment of M. Hermant's essay that we draw attention) there should be no wish to limit either the extent or duration of the architect's responsibility: far from it; the object was only to place it on its proper footing. The high tone adopted by French architects in regard to this point, their pride in accepting responsibility, we have before had occasion to comment upon. It is a feeling which should everywhere in the profession be kept up and encouraged to the utmost. The more ready the architect shows himself to accept responsibility for his work, the higher he is likely to stand in public estimation.

The question of public competitions, which forms the subject of discussion at another sitting, seems to be viewed much more favourably by the profession in France than at the present moment it is in this country—in theory, at least; for in practice it must be admitted that English architects stand by it very faithfully. The remarks of M. Coisel, following a paper of suggestions for the improved regulation of competitions collected and put together by M. Davioud, assume almost as an understood thing that competitions are in the main beneficial; that, in fact, they could not advantageously be dispensed with. M. Coisel urges strongly that the carrying out of the work should always be intrusted to the author of the design which is classed as the first, and answers some objections to this principle, one of which is not unfrequently heard in this country, viz.: that the architect who receives the first premium may not have the general business ability and experience desirable in those who are charged with grave interests. To which M. Coisel very pithily responds that it is very rare to find a man capable of composing a really good and well-studied "project" who has not also the capacity to carry it into execution. A man may make pretty drawings, no doubt, and have little ability as an executive architect; but then a competition should not be decided by pretty drawings. The two other objections are that the author may be only an *instigateur pécuniaire* (rather a happy phrase) availing himself of the services of clever collaborators, or that "enfin la moralité peut être douteuse." M. Coisel knows none of his *confrères* whose honourable character could be contested; but no doubt, if such were the case, the author ought not to be employed, but should be bowed out with a premium. Having regard to these considerations, M. Coisel would recommend the signature of all designs with the authors' names, rather than the motto system, and the decision to be made in the first instance, not merely in regard to the general apparent excellence of the scheme, but also to the known business ability and honourable character of the author, the voting being:—

"Tant pour l'œuvre:
Tant pour l'expérience:
Tant pour la moralité."

This is a serious view, indeed, of the matter, and reminds one of Byron's comment when Macready was recommended to the Drury-lane Committee on the ground of his being not only a good actor, but a highly moral man, "Aha! then I suppose he asks 5*l.* a week more for his morality"? However, we will go so far with M. Coisel as to admit that there may be men capable of making very clever designs, to whom we should be very sorry to see large and important interests entrusted.

We must content ourselves with merely mentioning, as unquestionably the "centre-piece" of the group of essays here collected, that by M. Daly, "On the Relations existing between Monumental Archæology and Contemporary Architecture," in which the connexion of the art of architecture with the history and development of society is treated of in a masterly manner, and which we will rather advise our readers to peruse for themselves, than attempt an epitome of it, which we have not here space, at any rate just now, to do adequately. M. Davioud, whose name was recently brought before our readers as the designer of the proposed new Opéra Populaire in Paris, contributes a long paper on the history and development of the modern theatre, illustrated by a number of plans showing the progressive modifications of the general form and arrangement of the auditorium: some of the plans illustrating buildings long since removed, but of which reliable drawings remain. M. Davioud regards France and Italy as the two countries which have chiefly interested themselves in theatrical construction from a comparatively early date, and have thus more or less given the model to the rest of Europe: the two countries, however, leaning each towards a distinct form of house, arising from their different theatrical tastes; the enjoyments of the theatre in France being more literary than musical, and in Italy the reverse. We cannot quite see, however, that M. Davioud makes out his point in regard to the influence exercised by these conditions upon the shape of the plan; they would be more likely to influence size than shape, a lyric theatre always being capable of larger extension of area than a dramatic one, in proportion to the greater distance at which the singing voice can be heard in comparison with the speaking voice; and the preference of the modern Italian theatre architects, from the first, for an elliptical plan, while the French for a long time used straight-lined plans, seems rather traceable to the influence (which M. Davioud himself touches upon) of the traditions of the Roman amphitheatre upon the more modern buildings on the same soil. The paper, however, is one to be read with interest by all who concern themselves with theatrical architecture, on historic if not on scientific grounds.

The first volume of the "Annales," we may say in conclusion, is, in every respect, a record of permanent value, and noteworthy, not only for the information and suggestion it contains on important professional topics, but for the high tone maintained throughout. It is true that in London a report of this kind published two or three years after the date of the proceedings, would be considered quite superannuated; but we must say that the French architects do the thing uncommonly well, and seem to make it a main object to have something in the first instance worth publication in a permanent form, and to see that it is really well brought out when it does come. The publication of the Annals of the 1874 Congress was intended to be combined with this in one volume, but has been held back for a separate volume, solely to insure that it is more thoroughly edited. It is rather slow work, to be sure; but the subjects treated of are mostly of permanent rather than of passing interest, and the difference in what we may call the literary habits of France and England, in regard to periodical publications, must be allowed for.

There is another little distinction between the reports we have been noticing and those of our own Institute of Architects, and that is the insertion of memoranda as to the effect upon the audience of various points in the papers read, indicated by the parenthetical "*applaudissements, marques d'assentiment*," &c., &c. This kind of record sometimes becomes rather lively; for instance, when M. Daly is defining the word *organe*, as "un instrument qui sert à accomplir une fonction; par exemple, l'œil pour voir, l'oreille pour entendre, la langue pour parler. Voilà un organe dont j'abuse peut-être en ce moment. (*On rit.—Non! non! Parlez! parlez!*)" It would be very possible to decorate the reports of English architectural meetings with little memoranda of the same kind, but, on the whole, we venture to think that literary and professional dignity is better consulted by omitting any record of such momentary ebullitions of geniality. And as to "applaudissements," they sometimes come in the wrong place, as we all know, and then it is certainly better not to stereotype them.

ARCHITECTURE AT THE ROYAL SCOTTISH ACADEMY.

The designs for churches exhibited this year are few in number, but they show that the spirit af Gothic architecture is now better understood in Scotland than hitherto, and that Batty Langley is consigned to the limbo of the past.

The first drawing that meets us upon entering the small octagon is a perspective exterior of a "Competitive Design for Free Church, Mayfield, Edinburgh," by R. Thornton Shiells. No new Presbyterian church is now considered complete without a hall for weekly services and other gatherings being attached to it. These halls are generally relegated to the rear or basement of the church; but in this instance the hall is made to form a prominent feature in the design, being brought forward in a line with the west gable of the church, with which it is connected by the vestry and retiring-rooms. The church consists of nave, aisles, and transepts, with a gracefully-designed spire at the salient angle, the whole group being arranged in a picturesque manner, and having an air of importance not usually found in similar buildings. The interior of "Hillhead Established Church," by Campbell Douglas & Sellar, is designed upon the model of the Ste. Chapelle, Paris. The treatment of this interior is evidence of the leaning of the Church of Scotland towards the forms of the sister establishment of England, for it could, by the addition of a few accessories, be fitted for the ritual of the Prayer-book. Prominent in the centre of the apse stands the pulpit, with an unmistakable baldachino, which rises to a great height, over it. There is a certain fitness in this arrangement, seeing that in the Presbyterian Church the pulpit occupies the chief place, although it may be that in this instance the feature in question possesses no particular significance, but is merely introduced for æsthetic effect, and the effect of the whole interior, which is elaborately decorated in colour, is expressive and satisfactory. A "Competitive Design for St. Leonard's Church, Leicester," by William Rushworth, is an exterior of the severe muscular type, fairly effective, and showing some originality in the treatment of the lucarnes of the spire. Archibald Macpherson's "Essay in Church Design" is an exterior of a cross church, with tower at intersection, which is crowned by an embryo spire. Without pretending to originality, the design is accurate as to detail, and in good taste. Messrs. Peddie & Kinnear have not attempted too much in the "Leckie Memorial U.P. Church, Peebles," of which they exhibit an exterior view. The church, which is situated on a height, is a simple parallelogram, with a massular broach spire at one angle. It will form a pleasing addition to the attractions of this delightful summer retreat in Upper Tweeddale. The "Interior of New Church, Stonehaven," combines that massiveness of character and gracefulness of proportion which Robert Anderson succeeds in imparting to his interiors. The clustered shafts supporting the clearstory, square on plan, are very effective, but they will act as an effectual barrier to the use of the aisles during service; it may be, however, that it is only intended to seat the centre of the nave, and leave the aisles free: an arrangement which is altogether the most satisfactory where it can be carried out.

"The Abbey Church, Edinburgh," by Robert Moreham, Junior, of which we have an exterior perspective, is far from being a happy composition; the parts are clumsy and huddled together in a manner destructive to breadth and unity of effect. There is nothing to find fault with as regards the detail, but the respective parts seem crushed and small, with the exception of the bulky tower and spire.

The "George A. Clark Hall, Paisley," by Rennison & Scott, is an imposing Gothic pile, with traceried windows, and a large turreted tower. The detail is bold and effective, and the composition picturesque, without being overstrained. It will group admirably with the old abbey church which it adjoins, and its situation by the river's bank would be greatly to its advantage were not the stream polluted by the refuse of manufactures, &c.

The "Public Hall," designed by Allen G. Macdonald, although good to a certain extent, contrasts unfavourably with the preceding. It is deficient in power, and rather fussy and uncertain in detail. From the drawing exhibited by Campbell Douglas & Sellar of "Additions to the Bank of Scotland Buildings, Glasgow," it does not appear what portion is new. The buildings are Italian in style, and the whole in thorough keeping. T. B. McFadyen exhibits the elevations of new streets at the Market-place and Vicers-street, Falkirk, which are in the ordinary style of modern street architecture, agreeably diversified and arranged. Mr. McFadyen's design for the "Mansion House of Arnothill, near Falkirk," is decidedly English in feeling, having none of the Scottish element incorporated with the Elizabethan, which is of the purest phase of the style, and happily carried out.

The "Dunfermline Corporation Buildings," by J. C. Walker, have the outline and grouping of a Gothic town-hall, but the style is after the Scottish manner, broadly treated. The lintels of the upper tier of windows do not rise above the line of cornice, and yet gablets are placed over them which are unnecessary and uncalled for, otherwise the design is commendable. The elevations of two new hotels in course of erection in Edinburgh, by M'Gibbon & Ross, display all the characteristics of stone construction, but the buildings themselves are being erected in brick and compo. One of these designs possesses sufficient merit to have been carried out in more presentable materials, but the range of chimney-pots which form the cresting of the mansard roof are frightful to behold. The Royal Hotel, in Princes-street, is to be furnished with a new façade, designed by William Beattie. The design is business-like and appropriate, but we hope that in this instance bricks and compo are not to supersede the present stone front.

The "Hydropathic Establishment at Moffat," by Fred. Thomas Pilkington, exhibits some of the mannerism peculiar to that gentleman, but in an unobtrusive way. The flanking towers of the centre block do not seem all of a piece, and appear as if designed without special purpose, unless it be to relieve the monotony of outline in a wide spreading façade.

Walter F. Lyon seems thoroughly imbued with the Mediæval spirit. The drawings of "Tyndyate House, near Aberfeldy," and "Pendly Manor House, near Tring," we at first sight mistook for drawings of ancient manor-houses. The halls and staircases are very quaint and picturesque. More stately and grand is the "Saloon of Wemyss Castle, Fyfe," by Messrs. Peddie & Kinnear, where massive oak panelling and a plaster ceiling, in the Elizabethan style, are brought into play.

The "Monument to the Earl of Galloway," by Alexander Skirving, a Gothic cross, with dumpy columns of coloured marble, contrasts unfavourably with the dignified repose of the monument designed by William Leiper, where a Runic cross, having the figure of an angel in front, is placed upon a well-designed basement, forming a happy combination.

THE RELATION OF MODERN ENGINEERING TO PUBLIC HEALTH AND LOCAL GOVERNMENT.*

THERE is no chapter in human history more interesting and instructive than that which tells of the progress of the art and science of engineering. When that whole history is hereafter written, it is not rash to say that British engineers will stand out pre-eminent. Though Indian work may rival theirs in beauty, Italian in grace, Egyptian in solidity, Roman in municipal service, they will, in the combination of their qualities, be found to have been equalled by none. And yet how short is the period in which British workmen have earned this fame. Some still living can remember when the lighthouse on the Eddystone was a novelty. As a boy I travelled on the first steam-worked passenger railway, shortly after Huskisson's death. Many now living saw the first telegraph-wire stretched along the western line. Steam applied to the largest men-of-war is but a recent affair. Ironclads were begun but the other day. A full appreciation by the masses of sanitary engineering, even if it exist now, is not of five years' duration. Three years ago, in this city, an able public man thought to gain a cheer by seeking to cast ridicule on those who prefer, like you, to prevent preventible disease rather than to cope with it unprevented. A like course would not be attempted now.

Considering, then, the infancy of knowledge and of public opinion on this matter, it is not strange that the place of the sanitary engineer is not yet precisely defined. To illustrate this place will be the object of the following remarks.

In the Public Health Act of 1875, the summary of all health enactments, his name does not once occur in the 343 clauses. He is still the old "surveyor" we all remember,—the plodding, energetic man of highways and byways, whose Anglo-Saxon vigour broke forth from the garb of corduroy, from the measuring-tape and links, into the transcendent skill of M'Adam, and whose followers take rank with men of courage, knowledge, and power, such as Brindley, Smeaton, Rennie, and Stephenson.

In considering the consolidated Public Health Act, it is strange to see how almost the high place of the engineer is unconsciously conceded to him. Every urban authority may be "surveyor of highways" (sec. 144), shall appoint "a fit and proper person to be surveyor" (sec. 189), and "the same person may be surveyor and inspector of nuisances" (sec. 192). But then the surveyor of the present day may be called to advise on anything, from the form and cost of an earthen syphon trap, to the calculation for work to be done by engines which are to supply half a million of persons with water, safe to be sipped in wine glasses, and delivered in quantities adequate to cleanse the foulest and largest of factories,—to be responsible for the construction of sanitary mechanism, from a housemaid's sink to an "intermittent downward filtration farm." If required to act also as inspector of nuisances, he has to have knowledge of what is dangerous to the public weal in respect of any and all nuisances; of all filth-producing agencies; of soundness and unsoundness of food; of occasions of epidemics and contagions. He is to be able to carry out all measures for prevention of infectious diseases advised by the medical authority. He is faithfully to observe and execute all lawful orders of the Local Government Board which may be hereafter issued. Such is the modern civil engineer when attached, for purposes of local government, to a sanitary authority, urban or rural.

I should not presume to speak on so wide a topic, but that my attention has been drawn to it from boyhood. While still a student at the university, I was much impressed by examining the gigantic arrangements for supplying ancient Rome with water, and by traversing along its whole length, the splendid aqueduct on the north coast of Africa, which, taking its rise on the hills of Lagonban, supplied a vast stream to Udina and to Carthage.

I venture to show you various sketches illustrating this great work, made on the spot forty years ago. I would draw attention specially to the fact that the sources of the stream as it issued from the mountain were guarded by the walls of a spacious edifice with religious care. Not long after, during a residence of some weeks in Holland, the skill and engineering triumphs of that strange and noble country filled me with admiration. Chance fixed me in a professorship here, and I was forced by the local Acts to be officially a street commissioner.

What a contrast was then found by me to those works which had so instructed me in Rome, Carthage, and Holland. An undrained town in a sodden valley, a foul and filthy water-supply, and no power to obtain money to remove these evils. Still worse, there was an administrative Board, unfit and unable to cope with the evil or to appreciate the risk. It would be a strange tale for those who think we are not improving if the complacency were described with which men then lived on a site which we now know needed but a chance combination to decimate it with typhoid. The town was riddled with cesspools, in the midst of which the shallow wells were dug. The waterworks pumped up with an uncertain and infirm water-wheel a liquid fouled by the overhanging privies and the filthy ditches of the slums of the city. There was no systematic drainage. What drains there were were rudely executed in gaping brick. By a special engineering effort, a sewer was constructed from the north to the south of the town. When completed, it flowed the wrong way, and was abandoned. I forbear to describe the cesspools under kitchens and in entrance-halls, the alleys, the houses. An upper floor in one dwelling served as a fancy dog-kennel, which I saw filtering its filth through the rotten floor on to the bed of a woman in labour in the room below. The tenement belonged to an elected, not an official, street commissioner.

At length the local Acts were abolished, the imperial Acts were adopted, a local Board formed, and Mr. White has shown you the outcome in our drainage works to-day. Steadily, if slowly, the local Board is doing its work. Every year the number of those in the district who have mastered the sanitary problem to be worked out in this country increases. We have as the assiduous chairman of our drainage committee one of the first scholars of the age,—Dean Liddell. Many besides him now know well that the regulation of the surrounding flood-waters, the purification of the Thames and the Cherwell, the distribution of the sewage by irrigation, the destruction of bad courts and of cesspools, the erection of proper dwellings,—all, in short, of the requirements of a healthy town,—are to be steadily aimed at, and at the earliest moment secured. Yet progress cannot be always rapid. One of the wealthiest colleges, the chief landowner of the best building sites of the town, but lately allowed the erection of whole rows of villas without sewers or safe water-supply. It has thereby riddled the before virgin gravel with cesspools and wells, as in the arrangements of old, and left the unhappy householders to awake from their dream of possessing healthy suburban dwellings, and to find already various fevers and other maladies occurring from the combination of bad workmanship with imperfect drainage. These circumstances are alluded to because they are an illustration of what goes on in many places, and are therefore of general interest. Yet we must not conceal from ourselves that the complete sanitary administration of a densely-peopled state is fraught with much difficulty. Look once more at Oxford as an illustration. It was pointed out twenty years ago that the management of every river-basin as a whole is essential for the several towns on its banks. Though many riparian owners on the Thames have done much, and are spending much, Father Thames still goes his own way. He is still fouled by his neighbours. He still floods them in revenge. He still wastes his waters at his will. Would this have been tolerated in Holland even two centuries ago? Are we to have over Dutch engineers, as once in the days of Vermuyden, to confine him again to his banks? Will Mr. White's costly works keep the cellars of St. Ebbes and St. Thomas dry, or will they still leave the floods to permeate the subsoil of the lower parts of the town?

We may answer to this that there is every hope that the Duke of Marlborough's Commission will bring to practical effect the work on which it has been now so long engaged; and the rate about to be levied for the survey and other expenses will inaugurate a complete system of water regulation in the Thames valley; and, at all events, that English engineers are ready, when they return from their Dutch engagements, to undertake our minor works here. These circumstances connected with the place in which you meet have only been introduced to illustrate the subject before us, "The Relation of Modern Engineering to Public Health and Local Government."

In the case of all towns such as those comprised in the Thames Valley, there are, over and above the ordinary work of town management, such as laying out streets, erecting houses on healthy models, and constructing sewers, both the draining of the surrounding districts and securing an uncontaminated and ample water supply. A memorial was drawn up in 1862, urging the Government to attend to the regulation of the waters of the Thames, not to the purification only, but to the storage at one time, and the liberation on another, as afterwards recommended by the Water Commission of 1869. This cannot be effected without a united superintendence for the area of the whole valley. The plans of one superintending engineer must be followed through the whole basin, in the tribu-

* Read by Dr. Acland, F.R.S., President of Medical Council, at a district meeting of the Association of Municipal and Sanitary Engineers and Surveyors, held at Oxford, February 18th, 1876. Mr. Lewis Angell in the chair.

taries as in the main channels. These plans could not be carried out without competent, well-trained, local sub-engineers, acting under the Local Sanitary Authorities, and in harmony with each other. The superintendence of wisely-devised sanitary areas for engineering purposes should be like the organisation of one of our best railways, viz., into districts and sub-districts, with connected supervision of the whole. There are, therefore, many points to which the attention of this Association may be usefully drawn. A few may be named:—

First, the Association may help to impress on the public the detailed, as well as the comprehensive character of sanitary engineering, which has at length become a special and important profession, and bids fair to rival in magnitude, though we hope not in cost, the establishment of railways thirty or forty years ago.

On the details of sanitary work it would be impertinent for me to enlarge. Yet, speaking as one of the public, I may remark that a very short time since architects and surveyors often undertook sanitary works with very imperfect knowledge of what had been done, or of the skilled contrivances which existed.

This Association will do good service by interchanging and making public the details of their experience. Many of the useful contrivances, such as those made years ago by Clark, of Carlisle, and many of the fittings introduced by Jennings, existed long before they were generally used. We spent much money here on bad fittings years after good ones were in the market. But this stage has passed, and we have another danger ahead—the danger of advertised and spurious wares "floated" under many names, and processes which have not a shadow of scientific foundation. Many will suggest themselves to your minds. This is the more to be regretted, because no profession affords so many instances of valuable contrivances, either suggested by untaught men of genius, or the result of scientific culture by true experts. I will name three: the arrangement for dividing overflow water by the property of its velocity,—applied, as I understand, first by Bateman in the Manchester Waterworks; the method of laying sewers in straight lines from manhole to manhole, planned, I believe, by Rawlinson (whose name I cannot mention without esteem as well as respect); and the scraper for internally honey-combed iron pipes, invented by William Froude; the outcome of consummate knowledge and masterly powers of observation.

When we see great results produced by such simple methods, we do not despair of the sanitary arrangements in houses and cities becoming very shortly reduced to an absolute certainty, when every district will have its superintending sanitary engineer, versed in the best knowledge of the time, and with a staff of trained and conscientious workmen.

The details are almost all known already. That sanitary pioneer, Chadwick, has lately summarised the wants of the house,—to be weather-tight, damp-proof, miasma-proof, with warm fresh air, unwasteful warming apparatus, safe water-supply and sewerage within, and an authority to remove refuse and dispose of it with economy and safety without. And so, in the case of large collections of houses, *i.e.*, cities, Mr. Rawlinson has, in his masterly way, sketched suggestions for main sewerage and water supply, on the principles on which skilled borough engineers are building. Gigantic works, indeed, are in operation or progress in every direction. Above all, the good sense of the country is embarked in the work. Every place has its Sanitary Authority composed of elected residents,—would they were always selected also,—and every place has but one Authority.

We have entirely passed out of the stage of needing proof of the evil of unsanitary conditions. We are in the hands of the Executive. We have to find out the cheapest form of permanent staff to carry out the instructions which accumulated biological knowledge and experience demand. The Medical Department of the Local Government Board will always have that knowledge. It is a knowledge only to be obtained by skilled experts giving their lives to its acquisition. Like most other knowledge, when obtained it may be handed over in a clear and intelligible form to all willing learners.* The advising inspectors and our highly-instructed periodical literature are making all such sound knowledge common property, possessed by the most intelligent persons in even remote districts.

Next with respect to the comprehensive character of sanitary engineering.

The Royal Sanitary Commission urged, and urged with effect, that there must be a Sanitary Authority for every spot, and but one Authority. This now is law. But it further advised that the areas of the Authorities should be readjusted. This is partially done, though it might have been better done. Medical officers can be appointed to areas of any size whatever, according to the conditions of the localities, and with the approval of the Central Board.

These two principles—the having even every hamlet under proper sanitary care, and the power of combining areas into the most suitable dimensions, according to the population and the physical conditions of the districts—lie at the root of the whole question of national sanitary arrangements.

But we may see at a glance that these principles touch, not only the details of local taxation and administration, but the mode of Imperial supervision of any national funds given in aid of local sanitary work. It is greatly to be regretted that popular writers do not always note this. They often blame Government for not settling by a stroke of the pen what touches every local interest and property in the country. So large a question has unavoidably baffled as yet every statesman who has approached the subject. But every session of Parliament throws light upon it, and brings us nearer to a solution. For my own part, I retain the conviction of many years, that the true policy for securing the national health lies in the steady education of the people to take a thorough and intelligent interest in perfecting, under local management and central or Imperial advice and supervision, their local sanitary arrangements.

I am more convinced than ever that coercion, even if attempted, will in the end retard progress. Theorists may dislike the political truth that in this country neither the Government nor the people, separately from each other, direct public opinion or make public laws. It is discussion, and action and reaction between the two, which bring about among us stable progress. Practical life in England does not rest on logical science.

The profession of engineers is one which, above all others, has been self-made, and without the trammels of regulations. This has been at once a source of strength on the practical side, and of danger on the scientific. But without pursuing that subject, it must be admitted that the sanitary engineers of the future will need as much consideration in a perfect sanitary organisation, as the legal or the medical department. It will be for the engineering profession itself to see to the training of its students, the due supply of its ranks, and the guarantee for the fitness of its members.

The public grievously need some guarantee. Health authorities have often been put in difficulty to know in whom they can place their trust, whether they seek for knowledge to guide them, or high character to keep down expenditure.

History has shown that much bad work has been heretofore done either from lack of training or want of experience. Much money, too, has been squandered because the interest of the employer has not always been the first object in the execution of works. There are many remarks worthy of attention on this subject in the writings and autobiography of Sir John Rennie. But, this being said, it is right to add that probably there never was a time when it was so easy as now to obtain competent and upright men for the superintendence of sanitary work. It will go far to reconcile England to complete redistribution of areas for purposes of local government, and for the establishment of a complete executive for the objects of preventive medicine, if people are convinced that no works are advised which are not really needed, and that none are taken in hand which are not faithfully executed in respect of durable workmanship, and carefully controlled in respect of cost.

For this end, as in other departments, but two things are necessary,—the average knowledge and good sense of the practical men of a district for all local purposes, with highly skilled imperial inspectors to occasionally advise and assist. The germs of this system we already have in both the medical and engineering departments. A few years more, and we may hope to see the full harvest of our experience gathered in, and a thickly-peopled country for the first time parcelled out into areas where all that can be done for health is done, and nothing done which is needless or fantastic.

Lastly, in a memorandum in the Report of the Royal Sanitary Commission, the "National or Chief Health Office," or the "Local Government Board," is said to be divided into six departments:—1. Legal; 2. Engineering; 3. Statistical; 4. Poor-law; 5. Medical; 6. Medical Legislation. In the Public Health Act of 1875 by far the greater number of clauses are necessarily devoted to subjects purely legal. Comparatively few are needed for the direction of the constituted authorities in respect of the medical officer of health or of the engineering officer of health. Every authority is obliged to appoint both, as well as an inspector of nuisances. But either of the two chief officers may act in the latter capacity also.

The engineering officer or surveyor has a very onerous duty. He has to execute and maintain what the science of medicine suggests as desirable to be attempted; to enforce and maintain cleanliness, and to provide pure air, pure water, dry and pure dwellings. All this is to be done, as far as the conditions of our climate and nation permit, from every cottage on the hillside to the palace in the city; and on every site, from the crowded alley to that princely, but often dangerous, dwelling, an English country seat.

There is a great future for the sanitary engineer in this country. The Institution of Engineers proudly boasts that it aims at "directing the great sources of power in Nature for the use and convenience of man." Well have the British engineers striven to this end. They have invented countless machines for useful and infinite ends;* have constructed all over the world railways and bridges, opening up unknown and before unattainable regions; have built lighthouses and docks, and ships with scarce a rival; and, lastly, they have begun a yet more useful work, more necessary, more blessed, soon we hope to be one more gem in their professional crown—they have entered on the search after the most economical means for providing a healthy home for every man, rich or poor, according to his wants, his place, and his condition, and thus they will make possible a virtuous and happy fireside for our crowded and toiling millions.

* See the instructions for medical officers of health by the General Board of Health, 1848; and the same of the Local Government Board, 1874, and those to inspectors of nuisances, and many local Acts and bye-laws.

"CUBITT'S," GRAYS-INN-ROAD.

VISIT OF THE ARCHITECTURAL ASSOCIATION.

MOST Londoners have heard of "Cubitt's," but probably very few, comparatively speaking, even of those engaged in the architectural profession or connected with the building trades, have any idea of the largeness of the establishment and its resources. A visit to the works of such a firm, celebrated as they are not only for the quantity of work turned out, but for its variety and excellence, cannot fail to be of extreme interest and instruction to the young architect anxious to obtain as many "wrinkles" as he can in the details of practical construction; and it is, therefore, not to be wondered at that the members of the Association mustered in strong force on the occasion of the visit which, by the kindness of the principals of the firm, took place on Monday afternoon last. This visit was arranged for Monday in lieu of Saturday, on account of the Saturday half-holiday, in order that every department might be seen in full operation. The members, headed by Mr. John S. Quilter, president, and Messrs. Clarkson & Hayes, honorary secretaries, assembled at the works at three o'clock, and were courteously received by Mr. Robinson, one of the partners in the firm, who introduced them to Mr. Wyatt (manager of the carpentry and joinery department, saw-mills, &c.), and Mr. Keay (the engineer of the establishment), by whom they were conducted over the whole of the works, and to whom (together with the foremen of the various departments) they were greatly indebted for much practical information, and for the kindness with which it was imparted. The visitors first entered the principal joiners' shop, a very large, lofty, and well-lighted room, in which all the best joinery work is done. Here were to be seen in various stages of progress door and window frames, doors, partitions, office and other fittings, all the best of their kind, and in various woods, much of the work being for large mansions of the nobility which the firm is now engaged in erecting or enlarging. Mr. Wyatt

* See the preface to the first volume of Smiles's "British Engineers."

having explained and practically exhibited to the visitors the different modes of veneering, the party entered the "Wood Museum" of the establishment, which is a miniature edition of the Museum at Kew Gardens. The little museum at Cubitt's leads out of the principal joiners' shop, and contains specimens of every description of wood, British, foreign, and colonial, used in the building trade, and others besides. Among the many interesting practical points to which Mr. Wyatt drew attention was that a great deal of the "figure" of the wood depends upon the cutting. Wainscot oak cut in one direction may have no figure, but yet, cut in another manner, may be full of it. In bird's-eye maple, again, the figuring will present different appearances according as it is cut from the outside of the tree or towards the heart. Sections of various casement stiles, including one (made for the Duke of Westminster) of peculiar construction and shod with brass, in order to form an air-tight and dust-proof joint, having been explained, the visitors entered the machine joiners' shop, another very large and well-lighted apartment, where were to be seen in operation planing, mortising, tenoning, and various other machines capable of doing almost, if not quite, everything that can be done in the shape of wood-working. A very ingenious machine for doing all descriptions of "Gothic" work, sunk lozenges, &c., was particularly interesting; indeed, the wood working machinery generally attracted considerable attention, not only on account of the almost infinite variety of work which it is capable of turning out, but because of the excellence and beauty of finish, to say nothing of the marvellous rapidity with which the most elaborate pieces of work are produced. To give, in the form of a newspaper report, a tithe of the practical information imparted in this department alone would be well-nigh impossible, even if the exigencies of space allowed us to attempt it; but we may mention that among the specialities pointed out were a peculiar system of tongued-and-grooved flooring which Messrs. Cubitt have largely adopted, and the patent dowelled doors (made by special machinery), framed together with strong oak dowels instead of mortise and tenon joints,—these doors having been used very largely (if not exclusively) in the Peabody buildings. Having visited the saw-mills, the party passed to the wrought-iron girder shop, where girders were seen in process of building up and riveting, and powerful punching and shearing machines were cutting and holing stout iron plates as if the latter were no tougher in substance than cardboard. Passing to the stone-masons' yards and shops, work of various kinds and materials was in progress, both by hand and steam power, and machinery appeared to be used in this department of labour almost as largely as in wood-working. Much practical information as regards stone and stone-working was given to the visitors by Mr. Carter, the general foreman of masons. Particular attention was attracted to a heavy lathe in which a workman was turning a large baluster in Portland stone. The speed at which the work revolved was necessarily slow, but still it was great enough to cause chips large and small, and a cloud of coarse and fine dust, to fly off under the touch of the tool or chisel (somewhat resembling a short but rather stout crowbar) directly in the face of the workman, who was, however, unprovided with a mask or respirator of any kind. When we state that the chips and dust were thrown a distance of three or four yards, and that the workman was veritably in the thick of it all, the extremely injurious effect of the particles of stone inhaled by the lungs of the mason must be obvious. We spoke to the workman, who appeared to be a very intelligent man, and he said he formerly wore a respirator, but he found it too "choky," from the fact, we suppose, that it became clogged with the particles of stone; he had, therefore, discontinued it, his own remark being that "one can but be choked, either way." Will Dr. Richardson's feather respirator suit the case of men working under such trying circumstances? If so, the sooner it becomes known to them the better. The visitors passed from the stone-masons' department to that of the marble-masons, where machinery is also largely made use of, and where Mr. Greenham, the foreman, explained some of the methods of work. In this part of the establishment is another museum, where, in addition to a large number of beautiful chimneypieces, specimens of every variety of marble used for building purposes are exhibited, one of the rarest and most beautiful being that known as "Chinese." The visitors next proceeded to the iron foundry, where the operations of moulding and casting were practically exemplified, under the superintendence of Mr. Ridge, the foundry foreman. The engineers' shop was next visited, and it will convey some idea of the resources of the firm when we say that here are made all the machinery and mechanical appliances of every kind used on the establishment. Next was visited the stove-makers' and locksmiths' shops, the visitors passing thence to the terra-cotta and cement works and kilns, where they were received by Mr. Baldwin, the foreman. One of the kilns, only opened the same morning, was full of very well finished terra-cotta air-bricks; but all kinds of terra-cotta work, up to the largest and most elaborately moulded pieces, such as vases, cornices, &c., are made on the premises, and a very fine collection of specimens was exhibited in an adjoining show-room. The terra-cotta is compounded of broken glass and crockery (a quantity of which was being ground to powder for the purpose by two pairs of edge-runners), and London or Poole clay, according to the colour and material desired. In this department, too, the firm makes all its own cements. The visitors having passed through the plasterers' and modelling shops, where some interesting work was to be seen in progress, concluded their tour of inspection at half-past five by a visit to the general show-rooms. It may be interesting to state that about 800 men are employed on the premises; but reckoning those engaged on "works in progress," the number of men employed by the firm is about 3,000. That machinery is very largely employed will already have been gathered from what is previously stated; but the fact that upwards of a mile of shafting is used will perhaps convey this more strikingly. We were given to understand that the firm prefer to manufacture their own goods and materials throughout, not only from motives of economy, but from the higher consideration of securing the best of quality. On leaving the premises, votes of thanks were given by acclamation to "the firm" for permitting the visit, and to Messrs. Wyatt and Keay and the foremen of departments who had so kindly contributed to the instruction of the afternoon. The only drawback to the comfort of the visitors was that they were so numerous that (notwithstanding the spaciousness of Messrs. Cubitt's premises) it was impossible for all to see or hear equally well. However, one set of members did not continue long to monopolise the front ranks, for, by sudden turns or changes of route, those who were in front at one moment were behind at the next. The visit was one of the most instructive and interesting ever made by the Association.

A NEW RECREATION GROUND FOR SYDENHAM.

THE inhabitants of Sydenham and Forest Hill are taking steps for securing an ornamentally-laid-out recreation-ground for the use of the residents in the neighbourhood, and last week a meeting was held to promote the object in view at the Foresters' Hall, Forest Hill,—the Earl of Dartmouth in the chair. The Hon. and Rev. A. Legge proposed a resolution to the effect that the meeting heartily approved the securing an open space for a recreation-ground for the public use in Sydenham. The resolution was warmly supported by several persons present, and unanimously adopted. The next resolution, moved by the Rev. W. Taylor Jones, who is taking a warm interest in the matter, declared approval of a piece of land of seventeen acres in extent for the purpose of a people's recreation-ground for their free use for ever, and the appointment of a committee and officers to carry out the wishes of the resolution. Mr. Jones, in moving the resolution, observed that a piece of land had been placed at their disposal by the owner, Mr. Adams, on most liberal terms. It contained seventeen and a half acres, and was to be had for 8,500*l*. He had a confident hope that the Board of Works would help them, but they must at the same time help themselves. It was then proposed that a subscription list be opened to obtain funds to carry out the wishes expressed by the meeting, and several letters were read from gentlemen interested in the matter, one being from Mr. Horniman, giving a subscription of 100*l*. The Earl of Dartmouth, the chairman, also expressed his intention of subscribing 100*l*. towards the fund. It was stated at the meeting that the Lewisham Board of Works would see that the ground was made suitable for the purpose for which it was intended.

"AQUARIA AND THEIR CONSTRUCTION."

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

MR. C. H. DRIVER, F.R.I.B.A., read a paper entitled "Aquaria and their Construction," before the Civil and Mechanical Engineers' Society on the 24th ult. The author devoted the first portion of his paper to a brief historical sketch of the subject, in the course of which he noticed the *vivaria* of the ancient Romans, and the tanks, &c., used by the Chinese and Japanese dealers many centuries ago, for keeping fish, &c., alive. He then proceeded to point out that the aquarium, in the sense in which the word was now generally understood, was quite a modern contrivance. The Fish-house in the Zoological Gardens, Regent's Park, opened in 1853, was the first public aquarium in England. In this aquarium the method adopted for keeping the sea-water in a fit state for the animals was by constantly renewing the contents of the tanks by obtaining fresh sea-water, and throwing away the water that was supposed to have become stale and unfit for further use. It was not then practically known that, by properly exposing the water to the action of the oxygen of the air, and by keeping it for a time in a dark chamber or reservoir, the same water could be used continuously, and would not require to be changed. The application of this knowledge to the subject of aquarium construction and management was first made by the Superintendent of the Crystal Palace Aquarium, Mr. W. A. Lloyd, whom Mr. Driver considered to be the greatest authority upon the subject of the aquarium and all its belongings that we have.* In 1862, Mr. Lloyd went to Hamburg, and in the Zoological Gardens there arranged an aquarium upon his system, which was opened in May, 1864, and was a great success, both scientifically and financially. Of the many aquaria subsequently erected, Mr. Driver selected the one at the Crystal Palace (of which he was the architect), and that at Brighton, as illustrating the two systems of aëration principally in use. Some plan by which the same sea-water might be supplied with oxygen, and kept in a clear and pure condition, was necessary for the very existence of the Crystal Palace Aquarium, whereas the position of Brighton made the sea-water so readily available that it could be changed as often as thought necessary. Loss of health to the animals was, however, always occasioned by the introduction of new sea-water. At the Crystal Palace Aquarium the water was never changed by the addition of sea-water, but fresh water was added as required, simply to supply the loss by evaporation, and any solid constituents which the animals might abstract from the water as material for their shells was replaced, so that the ordinary composition of sea-water was maintained. Although, as regarded architectural enrichment and size, the Crystal Palace Aquarium did not approach the one at Brighton, yet, as regarded the object for which it was intended, Mr. Driver ventured to say it was by far the most successful of the two. The matter of size, or even of architectural effect, was a mere question of expense and the circumstances of the site, but the system upon which an aquarium was worked was a matter of principle wholly independent of either of these conditions, and was either right or wrong as it conformed with or differed from what were the necessary requirements of an aquarium, viz., an arrangement for the preservation, maintenance, and exhibition of marine and fluviatile animal life in a natural state by artificial means, and which shall be equally adapted to inland and seaside places. The Crystal Palace Aquarium was commenced in July, 1870, and opened in August, 1871. The building is about 400 ft. long and 70 ft. broad, partially occupying the site of that portion of the palace which was burnt down in 1866. It is one story high, with a reservoir beneath the floor holding 100,000 gallons of sea-water, and a series of sixty tanks holding collectively 20,000 gallons. All the tanks are constantly receiving water from the clear and cool reservoir below, which contains no animals, so that the motion of the water through

* A valuable article by Mr. Lloyd on the subject of "Public Aquaria" appeared in the volume of the *Builder* for 1874, vol. xxxii., pp. 626 *et seq.* This article has since been republished, with additions, in the form of a pamphlet, setting forth the whole subject, and pointing out what Mr. Lloyd maintains to be the errors of the system of water supply at the Brighton Aquarium. We hear that it has had much good effect in the direction intended. We may also state that Mr. Lloyd is now engaged on an elaborate *resumé* of the many articles, papers, lectures, &c., which the subject has called forth of late.

the tanks was incessant. The water was pumped through at the rate of from 5,000 to 7,000 gallons per hour. The pump was driven by a steam-engine working night and day. The machinery, pump, and steam-engine, and boiler are all in duplicate, to provide against the chance of a break-down from any cause. The water is poured into the two centre tanks in an equally divided stream, and by a simple fall of a few inches from tank to tank it flows by two routes to the lowest tank, from which it passes into the reservoir below. This incessant circulation of the water constantly exposes fresh surfaces to the action of the air, by which oxygen is absorbed. But, besides this, other small streams of water are made to forcibly enter the tanks from jets, by which a large quantity of air is carried down in very small bubbles. (These bubbles of air are so small and so numerous that they appear like very fine grains of sand diffusing themselves through the whole body of the water in the tanks.) The removal of carbonic acid is accomplished by the vegetation which spontaneously makes its appearance in sea and fresh water under suitable circumstances of light. The water is not, and never has been, filtered, but its clearness is obtained solely by the perfect system of circulation and of aëration. The unused food and excrementitious matters are oxygenated and dissipated by the air, which the water abundantly takes up and holds in solution. The whole process of purification is, therefore, chemical, and the success of the system may be judged from the fact that water seen in masses 9 ft. broad appears perfectly clear and bright. The aquarium was, as already stated, opened in 1871, and now, in 1876, the same water is in use as was then first put into the reservoir, excepting that which has been put in to supply that lost by evaporation and leakage. New water is a constant source of trouble, in many ways. Leakages, and especially small and continuous ones, are the curator's greatest enemy. Any one can see, and cure, great leaks, but the little ones give the most trouble. The building is very cool in summer; even in very hot weather the temperature is never higher than 68° Fahr., and that of the water in the tanks never exceeds 63°. Much of its success is due to its coolness of aspect. It is protected by a high bank of earth from the hot western sun, and sheltered by the northern end of the Palace from the still hotter southern sun. Its only open aspect, therefore, is the cool east. In winter, by means of hot-water pipes, the temperature of the air is maintained at from 60° to 65°, and the water at about 55°. The ventilation everywhere is remarkably good, and there is no tank in any of the entire series of sixty which cannot be brought, when required, into free contact with the open air. The amount of daylight can also be very exactly regulated. Turning to the Brighton Aquarium, of which Mr. E. Birch was engineer and architect, Mr. Driver said that, owing to conditions of site, it was necessary to place the greater part of the building below the level of the ground, a matter involving considerable engineering difficulties. It was close to the Chain Pier, and was protected from the waves by a strong sea-wall of concrete and Portland stone. The building was definitely opened in August, 1873. Its length is 715 ft., and its average width 100 ft. There are two series of tanks, twenty-one in number. These increase in dimensions from 11 ft. by 10 ft. upwards, the largest measuring over 100 ft. in length by 40 ft. in width, and holding 110,000 gallons of sea-water. This colossal tank is the largest in the building, and is devoted to the exhibition of porpoises, turtle, and other animals of large size. The system adopted for aërating the water at the Brighton Aquarium is altogether different from that in use at the Crystal Palace. In the Brighton Aquarium the water is pumped directly from the sea into reservoirs formed under the floors, and capable of holding 500,000 gallons, and from these reservoirs the water is pumped into the tanks as required. There is, however, no general circulation through the system of tanks and reservoirs, as at the Crystal Palace, but each tank is treated independently, and its water is aërated and kept moving by the injection of air by steam-power at the lower part. The effect is that the air, not being minutely divided and so permeating the whole of the water, rises rapidly in large bubbles to the surface, and the benefit of its presence is quickly lost. It has been said that this stream of slightly-compressed air *cools* the water through which it passes. This however, is a mere guess-statement, put forward at random with the hope that no one will question its accuracy. Unless the air were specially cooled, as is not done at Brighton, it might, indeed, *warm* the water. The only way in which cooling could be effected by such air is by the agitation caused at the surface when the bubbles there break, and a slight absorption of caloric would be caused by the evaporation thus occasioned, insufficient, however, to be indicated by any thermometer of ordinary construction. Practically, this attempt at aëration is not effective, for at times the water in the tanks is not clear, and it is then let out and replaced by fresh water, either drawn from the reservoirs or from the sea direct. Whatever success there is in the Brighton system is due to the immense body of water the show-tanks contain, which enables the water to remain longer unchanged in the tanks without detriment to the animals than would be possible in a smaller aquarium. It may be accepted as an inviolable law or axiom that whenever the water in any aquarium, sea or fresh, has to be changed at any time, or from any cause, such change or renewal is an admission of erroneous construction or management, or both. That cannot be a perfect system which is not applicable to *all* circumstances. The Brighton system is no doubt successful so far as it goes, but it is utterly unsuited for any inland town, owing to the expense of replacing the sea-water. On the other hand, the Crystal Palace system, while the only one which is suitable to inland towns, is equally suited to seaside situations.*

EXTENSION OF THE METROPOLITAN RAILWAY TO ALDGATE.

THE works for the extension of the Metropolitan Railway from Liverpool-street to Aldgate have just been commenced by Messrs. Aird and Messrs. Lucas, the contractors. The line, which is nearly three-quarters of a mile in length, commences by a continuation of the present line on the south-west side of Liverpool-street, near its junction with Bishopsgate-street, which it crosses under, and thence runs parallel with Houndsditch on the north-east side, terminating on the north side of Aldgate, nearly opposite the Minories. For the purposes of the line a large number of houses in Devonshire-square and other streets along the route, between Bishopsgate and Aldgate, are now in course of demolition, and to clear the ground for the erection of the Aldgate station seven houses and shops on the north side of Aldgate, having a frontage of about 120 ft. in length, are also being taken down, preparatory to the new station buildings being erected simultaneously with the construction of the extension line.

INAUGURATION OF THE SOUTH METROPOLITAN TEMPERANCE HALL.

THE South Metropolitan Temperance Hall in Blackfriars-road, which has already been noticed in the *Builder*, was formally inaugurated on the 21st ult. It may here be incidentally stated that, according to an announcement placed in front of the building on Saturday last, the structure is to be associated with the inevitable skating-rink, "Site for the South Metropolitan Skating-rink" being prominently displayed. The company who own the building have a large area of vacant land at the rear, extending to a depth of about 300 ft., and it is upon this land that the skating-rink is about to be formed, to which there will be a separate entrance from Blackfriars-road.

The new building, as now completed, is a prominent feature in the architecture of Blackfriars-road. The Blackfriars elevation is carried to a height of more than 60 ft. On each side of the ground-floor are two shops, the entrance to the hall being in the centre, approached by flights of steps on either side, with Portland stone piers at each angle, supporting ornamental lamps. Over the entrance, which is divided in the centre by a column in Mansfield stone, there are Gothic arches surmounted by carved pediments in Portland stone, and supported by Mansfield stone piers. Above this is a mezzanine floor, the elevation of this part of the structure being in Pether's red diaper brick, with a semicircular projecting stone balcony over the entrances beneath, and a bold projecting cornice carried across the line of frontage. Above is a lofty story, containing the great hall, lighted from Blackfriars-road by several large Gothic windows, the central window being 15 ft. in height and the six on each side 12 ft. high. The elevation is surmounted in the centre by a lofty gable, flanked on either side by stone turrets. Mr. John H. Swan is the architect, and Mr. Deards was the builder, and the cost has been about 7,000*l.*

* To be continued.

ASSESSMENT OF PROPERTY AT THE WEST END.

A PECULIAR assessment appeal against the rating of a West-end mansion came before the general assessment sessions last week. Sir D. C. Marjoribanks, together with the overseers and vestry of St. George's, Hanover-square, appealed against the assessment of the hon. baronet's mansion by the special sessions of that parish. It was stated that when the mansion was rated by the parish, he appealed to the special sessions, asking for a reduction of the amount. After an argument, the special sessions not only reduced the assessment to the amount originally asked for, but went even below that, which by this appeal the parish contended was illegal, arguing that the special sessions had no power to reduce the amount below that originally asked for in the court below. Sir D. C. Marjoribanks stated that the structural cost of the house was 55,000*l.*; but that did not include decorations, which amounted to about 10,000*l.* Witnesses in support of the appeal stated that it would be difficult to obtain a tenant for the house at more than 1,500*l.* a year; but the court fixed the rateable value at 2,000*l.* gross, and 1,667*l.* net.

PASSENGER TRAFFIC BETWEEN ENGLAND AND FRANCE.

Now that the construction of a sub-marine tunnel is seriously contemplated, it will be of particular interest to study the statistics relating to the passengers who cross the Channel. During the year 1874, according to the English consular report, the number of persons who embarked and disembarked at Calais amounted to 199,345. At Dieppe, in the same year, there were 58,235 passengers; at Boulogne, 110,419; and 24,265 at Havre. If we add to these figures the 45,495 persons who crossed the Channel to or from Ostend, we have a total number of 437,759 passengers, of whom 217,145 left France and Belgium for England; while 220,614 left England for the Continent. It remains to be seen how many of these passengers will prefer the gloom of the tunnel to the nausea of the Channel. Sanguine promoters of the scheme are tempted to conclude that travellers will almost unanimously prefer the tunnel, and that their number will be greatly increased. Considering, however, that there are many persons who now travel to Newcastle, Edinburgh, Bristol, and other ports by sea, notwithstanding the elaborate network of railways running constantly to and from these towns, it will not be surprising if a still larger proportion of travellers continue to patronise the Channel steamers even when the tunnel has been proved a success. The question remains whether it is worth while incurring the risk and cost of constructing the tunnel if it is destined to be patronised by only a portion of the half-million or so travellers who will be journeying annually to and from the Continent by the time this great work is completed.

THE COST OF GERMAN RAILWAYS.

THE construction of the railway net of Germany, of a length of 18,760 miles at the end of 1875, has cost 322,500,000*l.* The 3,000 miles in course of construction have already consumed over 30,000,000*l.*; so that over 350,000,000*l.* altogether are invested in German railways. With few exceptions, they have been made within the last thirty-five years, the last ten years showing a growth greater than that of the previous twenty-five. While in the latter period only 9,075 miles have been opened, since 1865 9,685 miles have been thrown open for traffic. During the same time existing railways were greatly added to, so that during the last ten years about 225,000,000*l.* have been expended in railway works. This makes 5*l.* 8*s.* per head of population, which may be considered as savings of the nation, only inconsiderable amounts of German railway shares being held by foreign investors, while foreign railway stock to the value of several hundred million thalers is held in Germany.

LEATHER WAREHOUSES, BERMONDSEY.—MR. BILLING, ARCHITECT.

NEW WAREHOUSES, WESTON-STREET, BERMONDSEY.

"THERE'S nothing like leather"; anyhow there is a movement in the market for it just now. The two large warehouses we have represented have just been erected for Messrs. Cleeve W. Hooper & Sons, late of Lime-street and Leadenhall-market, City, upon land belonging to the "Guy's Hospital Estate," the site having been cleared of a number of small houses for the purpose. They are situate near to the Bermondsey Leather Market, where several buildings for the leather trade have lately been erected, and a growing demand for others exists. They are built of brick, the principal front in Weston-street being faced with red brick and Bath stone, the side front of red and white bricks. The plinth is of granite. The basement is well lighted, and the floor formed of concrete and asphalte, the latter being carried up to the height of 4 ft. all round the inside walls to ensure the goods placed therein being free from damp. The ground and first floors, facing Weston-street, are fitted up and used as offices by the firm; the whole of the other floors are appropriated for hide and leather. The contract for the whole of the works has been carried out by Mr. Mann, builder, from the designs and under the superintendence of Mr. Arthur Billing (surveyor to the hospital), of the firm of Messrs. Newman & Billing, architects.

STREET ARCHITECTURE, MANCHESTER.

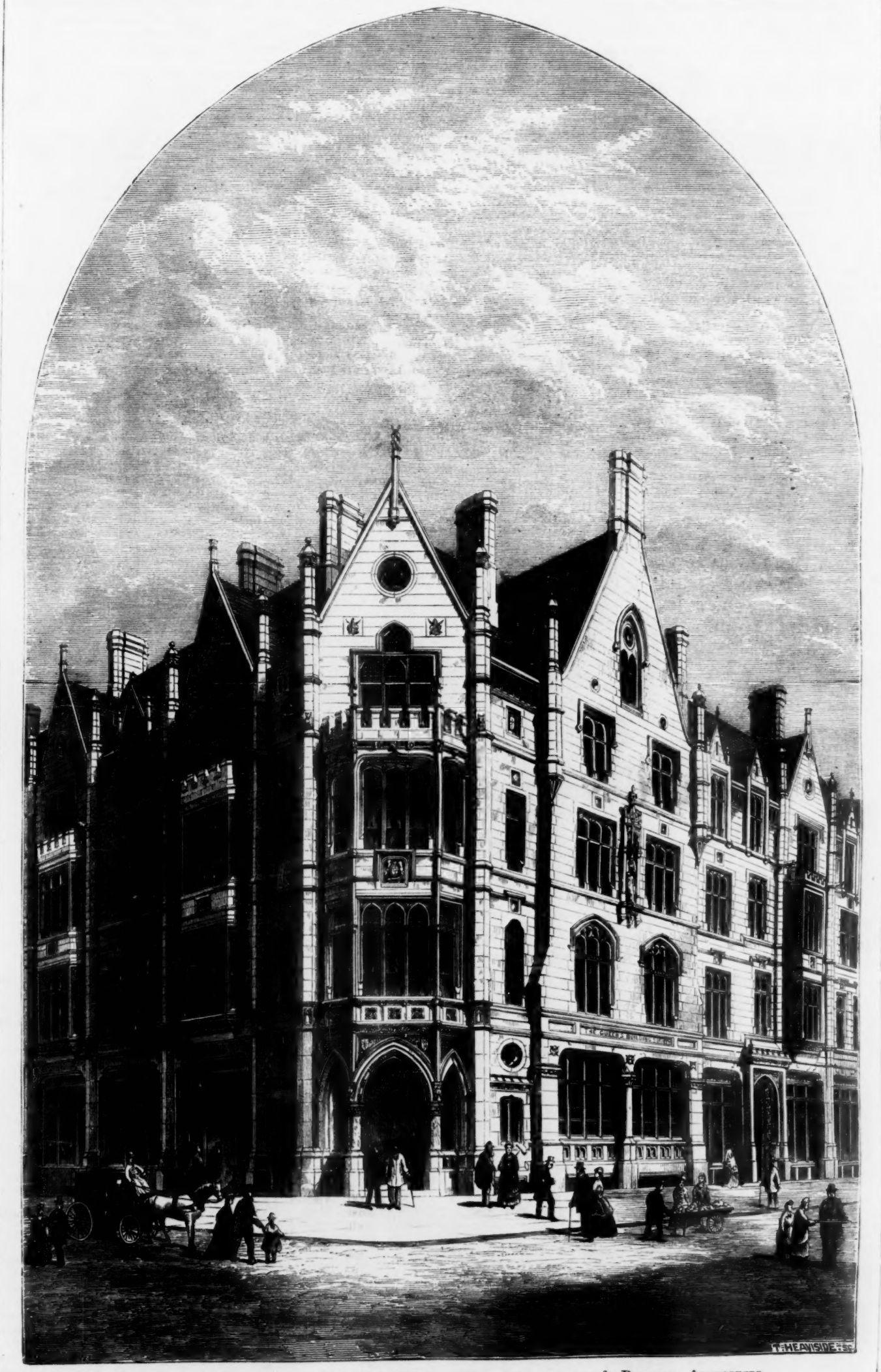
OUR illustration shows the major part of a very considerable block of building at the junction of Deansgate, now one of the main thoroughfares in Manchester, with John Dalton-street. On the ground-floor are shops, and on the upper floors, offices, and the basement is unusually commodious and well lighted, there being a large area in the centre of the site, faced with white-glazed bricks. The open arcaded angle entrance, together with the banking-room adjoining, and the manager's, board, and strong rooms behind will be occupied by the Queen's Building Society, —a society which is probably the largest in the Provinces, its annual income being nearly 1,000,000*l.*, and having over 16,000 investors. The business transacted is so extensive that in reality it is a mortgage bank, as all its investments are used in making advances upon real property, including warehouses, shops, offices, dwelling-houses, and cottages, and its members are drawn from all classes of the community.

The total area of the buildings is 117,000 square feet, and the façades in the two principal streets are entirely faced with Yorkshire stone, the corridors and staircases being fireproof, lined to dado-height with glazed tiles. Messrs. Robt. Neill & Sons are carrying out the works. The style is an adaptation of English late Gothic to modern uses. The windows, being nearly all square-headed, and having an average width of 2 ft. of glass between each stone mullion, abundant light is obtained. The details of the style have been carefully considered and worked out by the architects, Messrs. Pennington & Bridgen, of Manchester & London.

ART AND HISTORY AT ST. ALBAN'S.

A MEETING of the St. Alban's Architectural and Archæological Society was held a few days ago, and three papers were read. The Rev. H. Fowler described "The Boundary Wall of St. Alban's Monastery and its Adjuncts in the Time of Abbot Thomas de la Mare" (abbot 1349–96). Mr. R. R. Lloyd, the active secretary of the Society, read a paper "On the Paintings on the Choir Ceiling of the Abbey Church," the pith of which we give:—

It is my intention to bring before you a brief account of the paintings upon the ceiling of the choir, disclosed to view by the removal of the later series of paintings which had hidden the earlier ones from view. Reckoning from the western arch of the tower, westward as far as the rood-screen, there are sixty-six panels, arranged in eleven transverse rows of six panels each. In every row we find three panels, each charged with a shield supported by an angel, alternating with a like number bearing the sacred monogram I H C, drawn in four different ways, and surrounded by a scroll. The only exceptions to



STREET ARCHITECTURE, MANCHESTER.——MESSRS. PENNINGTON & BRIDGEN, ARCHITECTS.

this rule are to be found in the two central panels of the middle or sixth row, which contain representations of our Lord and St. Mary the Virgin, under canopies. There are also inscriptions, which occur only upon these panels bearing shields.

I will now proceed to read a description of the paintings and inscriptions, as they actually appear, adding the complete form of the quotations:—

Row I.—Panel 1.—Tibi laus & glia o ba trinitas
(Tibi laus et gloria o beata trinitas)
azure, 3 crowns or
Scutum sci Edmundi regis.
2. I H C.
3. Te laudat os creatu o ba trinitas
(Te laudat omnis creatura o beata trinitas)
azure, a saltire or
Scutu sci albani martiris.
4. I H C.
5. sals nra o ba trinitas
(salus nostra o beata trinitas)
gules, 3 crowns or
Scutu sci Oswyni regis.
6. I H C.
Row II.—Panel 1.—Simme trinitati once.
2. (Summe trinitati ?)
arg. a cross gu.
Scutu sci Georgii.
3. I H C.

* * * * *

[We must be satisfied with giving only a specimen of the inscriptions.]

Remarks upon the paintings fall naturally into—1st, the inscriptions above the shields; 2ndly, the charges upon the shields, and the inscriptions beneath them; 3rdly, the probable date of the execution of the work.

1st.—The inscriptions are only found upon those panels bearing shields, so that there are three in each row except the VIth, or thirty-two in all. Those in the first two rows are devoted to praise and prayer to the Holy Trinity. Next come portions of the *Te Deum*, amounting to twenty-three out of the twenty-nine clauses of which this hymn is composed, and occupying all the remaining rows, except the sixth or middle one. The first few words only of many of the clauses were given, as the space was too limited to contain the whole sentence. Thus the ceiling was made to re-echo, as it were, the glorious hymn of praise which the monks chanted in their stalls below.

The middle row (No. VI.), having its two central compartments occupied, as was mentioned above, by paintings of our Lord and St. Mary the Virgin,* two only of its panels possess inscriptions:—

2. Glory be to the Father, and to the Son, and to the Holy Ghost.

6. Glory to God in the highest.

Three clauses of the *Te Deum* (the number required for a single row in the ceiling) are missing between Rows V. and VII., as if they had at first been painted upon this middle or sixth row, and were afterwards painted out to make room for the existing designs.

2ndly.—I now come to the heraldic charges exhibited upon the thirty-two shields, and the inscriptions beneath them.

I.—1. Shield of St. Edmund (king of East Anglia).

5. Shield of the Emperor Constantine.

In this example, as well as in that of the Crusader king of Jerusalem (Row VII., panel 3), the positive rule in heraldry that metal shall not be placed upon metal has been purposely broken, probably in order to distinguish these arms from those of every other sovereign.

IV.—4. Shield of the King of England.

The coat "France Ancient" (semée of fleurs-de-lys) was in use in the quartered arms of the English sovereign from 1340 up to 1403, when King Henry IV., following an alteration made by the French king as early as 1364, adopted "France Modern" (3 fleurs-de-lys). Here you will not fail to notice the use of the more ancient charge.

It is remarkable that in this instance the customary arrangement is reversed in the quartering, so that instead of France occupying the first and fourth quarters, these are assigned to England, and the second and third quarters given to France. It is also followed in the other four examples of the quartered coat of England and France which this ceiling furnishes, whilst on a sculptured shield on the western side of the doorway leading from the church to the cloister, the usual arrangement is adopted, as also in the stained glass, in a window in the north aisle of the nave.

* 3. B. V. M., seated, nimbed and crowned; round her seven stars; above her a groined canopy.
4. Our Lord seated, nimbed with cross nimbus, right hand raised to bless, in left hand orb and staff with vexillum; above Him a groined canopy.

6. Shield of the King of Portugal (Scutu regis portingalie).

This [arg. 3 dice sable, each charged with 6 dots arg.: the whole within a bordure gu. charged with 7 castles] differs from the arms commonly assigned to Portugal, viz., arg. five escutcheons in cross az., each charged with as many plates in saltire: the whole within a bordure gules, upon which eight castles or.

V.—5. Shield of the King of Man.

The Isle of Man belonged, at the presumed date of this work, to William Montacute, Earl of Salisbury, who sold it in 1393 to William Scrop.

VI.—2. The shield of Faith (Scutu fidei).

The triple tau [here Gu., a triple tau arg.] is a common Mediæval device, but I am not aware of any other instance in which it has this title assigned to it.

6. The shield of Salvation.

A very suitable name for this design (Scutum sa tionis) [arg. a cross with three nails, and crown of thorns sa., surtout a spear, and rod with sponge, in saltire, between a hammer and a scourge, all gu.], which represents the instruments of the Passion.

The middle row in the ceiling has thus a special dignity imparted to it by the elaborate paintings in the two central panels, and by sacred devices, in place of heraldic ones, being painted upon the shields.

VII.—3. Shield of the King of Jerusalem.

(See remarks upon the shield of the Emperor of the Romans.)

VIII.—6. Shield of Lord Thomas, son of the king (Thomas Woodstock, sixth and youngest son of King Edward III.).

IX.—5. Shield of the King of France.

This is France Ancient, the field being semée of fleurs de lys.

X.—2. Shield of the Duke of Lancaster. (John of Gaunt, fourth son of King Edward III.)

4. Shield of the Prince of Wales. (Edward the Black Prince, eldest son of King Edward III.)

6. Shield of the Duke of York. (Edmond of Langley, fifth son of Edward III.)

XI.—5. Shield of the King of Scotland. This has a single tressure in place of the usual double one.

The six shields in the first two rows are devoted to saints; Row III. has our Lord as king of the Jews on the middle shield, between two emperors on the side ones; sacred symbols appear upon the two shields in the middle row, No. VI.; all the shields in Rows IV., V., and VII., the second and fourth panels in Row VIII., and the six shields in Rows IX. and XI. are allotted to the arms of European sovereigns, those of the Crusader king of Jerusalem being reckoned with them. The third shield of Row VIII., and all those of Row X., are assigned to four out of the seven sons of Edward III.*

3rdly.—Nearly all the heraldic evidence is in favour of the date of the work belonging to the later years of King Edward III. (reigned from 1327 to 1377).

(*a.*) The arms on shield 4, Row IV., assigned to the "King of England" are those in use in his reign.

(*b.*) The omission of the arms of Lionel, Duke of Clarence, third son of Edward III., seems to show that the work was executed after his death, which took place in 1368. This date, then, we may take as a starting-point, since the ceiling cannot bear an earlier date.

(*c.*) The arms on shield 4, Row X., being those of the Prince of Wales, point to a date not later than 1376, the year of his death, and confirmatory of this are the arms and inscription on panel 6, Row VIII., of "Thomas, the King's son," or Thomas of Woodstock, who was known by this title and these arms until 1377, when he was created Earl of Buckingham.

So far all is clear; we seem to have arrived at a date, for the series of paintings, between 1368 and 1376, which is quite as near as we can hope to get.

With this, too, coincides the style of the two central figures in Row VI.

But, on the other hand,† the arms and the inscription upon panel 6, Row X., to Edmond of Langley, who is there styled "Duke of York," both belong to a period subsequent to 1385, in which year he was raised to the dukedom.

Here, then, we find ourselves in a difficulty; for this coat of arms and inscription carry us at least eight years later than the time of King Edward III.'s death.

I may add that the canopies over the two central figures above mentioned do not look earlier than 1385.

So far as I can see, there is but one solution of the puzzle, and it is this: That the main features of the work pertain to the period between 1368 and 1376, whilst certain additions and alterations, notably to the arms and inscription to Edmond of Langley, Duke of York, were made subsequently to 1385, and before 1402.

From the *Gesta Abbatum* we learn that about the year 1314, King Edward II. gave a quantity of timber for the repair of the choir-stalls, and these, which were constructed by workmen skilled in wood-carving, under the direction of one Master Geoffrey, seem to have cost many years of labour, and to have been brought to completion by the year 1369. The choir was probably bounded at each extremity by a light screen; the eastern one, which stood beneath the eastern arch of the tower, separating it from the presbytery, and the western one standing one bay east of the existing stone rood-screen. Between these two was a passage, running north and south, as at Durham, which served as a vestibule to the choir. The canopied stalls, which, starting on each side from the eastern arch of the tower, extended under it westward to within one bay of the rood-screen, had two return-stalls of their western limit. These return-stalls, facing east, were appropriated, the southern one to the abbot, the northern one to the prior, who were thus enabled to keep watch over the behaviour of the monks. In 1874, in lowering the floor to its original level, the rubble foundations of the whole series of stalls (including the return-stalls) were found, and this discovery confirmed the description in the *Gesta Abbatum* of the arrangement of the stalls in every particular. My reason for making these remarks upon the choir-stalls is, that the account of the date of their construction renders it very likely that the construction and decoration of the choir ceiling would be taken in hand soon after the stalls themselves had been completed, and it is therefore of great value as a piece of independent evidence.

Mr. J. Chapple read a paper "On the Work of Restoration." The following is an extract as to the choir ceiling:—I may be permitted to mention the circumstances which led to the discovery. Under the choir contract this ceiling was to be substantially repaired. In carrying out the works it was ascertained that the panels of this ceiling were loose (each panel could be lifted out). They were taken out, and while workmen were screwing strengthening-pieces on the backs, it was seen that some had had a former coat of colour. The whole surface of the ceiling had been repainted in a very indifferent manner in the seventeenth century. Mr. Cobham, an artist, from the firm of Burlison & Grylls, being at work at the Abbey, suggested the removal of the later paint. This was a work of some difficulty, and required much skill. However, it was by him successfully accomplished. He peeled off the outer skin, and exposed to view a painting of exquisite beauty,—"The Shield of Faith" (Row VI., panel 2). So signal a success attending the first efforts, five other panels were similarly treated, and each presented a new subject of similar artistic value. Feeling it would be an act of barbarism not to present to the world such a fine example of ancient art, the scaffolding was retained in the hope that some one would supply the necessary funds. The result of the expenditure (300 guineas) has been to save from oblivion a fine work of the fourteenth century—a painted ceiling not to be surpassed in England for beauty or historical associations.

* King Edward III., Edward Prince of Wales, John of Ghent, and Thomas of Woodstock, are all mentioned in the Book of Benefactors as having made gifts to the Convent.

† Quarterly England, and France Ancient: surtout a label of 3 points arg., each charged with 3 torteaux Scutum ducis Eboraci. It is not known at what exact period the label charged with torteaux was substituted for a new label counter componée, or chequée, which distinguishes this prince in the Burghersh monument at Lincoln, c. 1360.

Mr. Geo. Locke, Carver.—We are sorry to hear of the death of this gentleman, one of a family which, for four generations, has been identified with the art of wood-carving. He was many years the designer to Messrs. Charles Hindley & Sons, Oxford-street, but had been for some time in business on his own account, and was devoted to the development of artistic furniture and decoration. At the time when the Society of Arts offered prizes for art workmanship, Mr. Locke was very energetic in the aid he rendered, and we printed several letters from him. His death was caused by an overdose of morphia.

LIGHT AND COLOUR.

SIR,—In what a perplexing state of confusion is the subject of "light." Where will the student find rest if he merely desires to rely upon authority? The Newtonian hypothesis of gravitation we were once taught was fully adequate to explain the relative position and movements of the heavenly bodies. Now, light is said to be the repelling agent, and what is included, in our text-books, amongst the imponderables, is weighed! Vibrations are endowed with a propelling power, &c.! And thus what we are taught by one physicist is totally incompatible with what we are taught by another. The best course, then, is either to suspend our judgments, or to take the matter in hand and investigate it for ourselves. Mr. Benson will find, both in my treatise and in recent letters in the *Builder*, that I have stated that Newton did not attribute light to the rays themselves or to external things. In that particular part of my essay to which he refers, I am alluding to some moderns who do not possess the Newtonian grasp of thought. Even Mr. Benson himself does not seem quite to have mastered the conception that light is a sensation. He discourses about a luminiferous ether. This language does nothing more nor less than attribute light to matter itself. He, however, is, either fortunately or unfortunately, not alone in this misconception.

We have rejected Newton's hypothesis of propulsion, and have accepted the conception of vibratory action. Good! Now, do not let us veer and shift from this to re-import a little propulsion or introduce a luminiferous and very mysterious ether. Grant the existence of this ether, what then? It is but matter which, being made tremulous by the action of the sun, produces all the various sensations of light in the optical organisation. The ether is not luminiferous. Light has, as Newton stated with reference to his different hypotheses, no external existence to sense but as a mode of motion. Mr. Benson in his Manual further confuses this elementary portion of the subject by using the expressions, "Colour sensations simple and compound," "Three simple or elementary sensations of colour," &c. What Mr. Benson means to say I suppose is this, that there are three elementary wave periods which, either separately or combined, produce all the sensations of light. We know nothing more about sensations than that they are sensations. We do not combine the sensations. We either change or compound the external vibratory action, and thus produce a different sensation. W. C. T.

COLOUR.

SIR,—Mr. Benson decidedly goes beyond the mark when he says that "it is reserved to me to prove that colours are something inherent in the object by breaking a brick and showing that the colour of the inside is the same as that of the outside." I never attempted any proof of the kind. What I said merely amounted to an assertion of what common sense tells us is a simple fact, and it is for him to disprove it, if he can.

I again assert, what in my opinion requires no proof, that colour is inherent in everything, and that all objects in nature, of whatever kind, whether they be opaque or transparent, have their own natural colour. Even the atmosphere is not colourless, while light contains all the colours of the spectrum, and alters the colour of objects illuminated by it according as one or another of these colours predominates. I agree with him that colours are sensations—that is, we cannot perceive them but by the aid of one of our senses—the sense of vision. Nor can we perceive anything but through our senses, and therefore it follows, that there are many other kinds of sensations besides that of colour. For example, if Mr. Benson were to run his head against my red brick, as he appears rather inclined to do, he would find that that was a sensation, and a very *striking* one too. JAMES K. COLLING.

SANITARY POLICE.

SIR,—With extreme pleasure I perused your remarks on the proposed action of the Society of Arts with reference to a sanitary conference. I have thought for years that the Government ought to establish a system of sanitary police to hunt up delinquent local authorities,—and they are legion.

I have looked into the condition of a great many of our towns and villages, and some of the results you have published, and do not need to assure you it will be perfectly useless for the Society of Arts Council, Government, or, for that matter, any one, to attempt to collect reliable information, either by correspondence or verbally: it should always be by personal examination on the spot, and close examination too, or those conducting the inquiry will be grievously deceived. Such is my experience, that local people will practise deception, though often unconsciously. R.

A DESERVED RECOGNITION.

ON Tuesday evening last Mr. J. R. Planché was visited by a number of his friends to congratulate him on attaining the age of eighty. In the course of the evening the following little address (which had been hastily determined on), written on vellum and pleasantly illuminated, was presented to him:—

TO JAMES ROBINSON PLANCHÉ, ESQ.
Somerset Herald and Good Fellow,
On the occasion of his 80th Birthday,
FEB. 27, 1876.

WE, your loving friends, who are gathered together under your roof on the 29th of February, rarest of days, to celebrate your 80th birthday, not many hours past, desire to leave behind us some brief record of the incident more tangible than spoken words. Rejoicing, we salute you! And, while striving to do you honour, are gratifying our own feelings, inasmuch as we thus note ourselves the bidden guests who represent ten times the number of good friends out of doors, excluded only by brick-and-mortar limits. Some of us can look back to those times when the town was delighted with the "Revels," and the "Devils," "Riquet with the Tuft," "The Invisible Prince," "The Island of Jewels," and a dozen other bright compounds of poetry and fun, all free from the smallest taint of evil. The more legitimate amongst us will perhaps recall "Charles XII.," "My Lord and My Lady," and "The Knights of the Round Table"; the poetical will think of "Oberon" and "Love's Triumph," or long for "William with the Ring"; the younger may sigh out "Faint Heart never Won Fair Lady," and thank you afterwards for "The Loan of a Lover." While the student of history will prefer to have you all to himself in "A Corner of Kent," with "The Pursuivant at Arms" and "The Conqueror and His Companions"; make free with your better part locked up in "The Cyclopædia of Costume"; or study Arms and Armour under your scholarly guidance in the Tower. As dramatist, as poet, as antiquary, and Herald, we, in common with thousands besides, salute you; and then, more privileged, we go further and hail you, friend! Bright, cheery, good, and genial friend! Recollections of personal sacrifices, made at the call of Duty and Love, occur to some of us; but these have brought you their own reward, a satisfied conscience, and loving hearts all round you. Advancing years have for you no fears:—

> "For age is opportunity no less
> Than youth itself, though in another dress;
> And as the evening twilight fades away,
> The sky is fill'd with stars, invisible by day."

Long, dear Planché, may you live to serve and please the world, and to make happy your large circle of affectionate friends

Amongst the signatures were those of Mrs. Keeley, Mr. Birch, Mr. S. Tucker (Rouge Croix), Mr. and Mrs. German Reed, Mr. Corney Grain, Mr. Arthur Cecil, Mr. Arthur Sketchley, Mr. Dillon Croker, Mrs. March, Miss Thackeray, Mr. Palgrave Simpson, Mr. Gibson, Mr. John Clayton, Mrs. Twiss, Mr. Van Wart, Sig. Gilardoni, Mr. Bendall, Mr. G. Godwin, and others.

PROPOSED ROYAL ALBERT BRIDGE, CANADA.

THE impetus which for several years past has been given to the construction of railways on the north of the St. Lawrence and Ottawa rivers, with a continuation through to the waters of Lake Huron, to tap the lake traffic of north-western States, a more immediate connexion by rail of the great lumber districts of the St. Maurice and Ottawa rivers, including their numerous tributaries, with the leading markets in the United States, the geographical position of Montreal, almost on the air-line, as well as other important considerations to be glanced at, are thought to demand a second bridge over the St. Lawrence at this city, in order to effect a union of those Eastern, Northern, and Western roads with the great American system on the South, and secure an easy and cheap interchange of traffic.

The point of crossing determined on is nearly identical with the one pointed out many years ago for the Victoria Bridge, when it was proposed to pass the river by a span of then unheard-of dimensions, from St. Helen's Island to a point east of the Market-place, and thence by arches northward to Côte à Barron.

The idea of that day is now being realised in the proposed Royal Albert Bridge, a fit mate for the Royal consort a couple of miles farther up the river. In combination with its railway traffic it has also been thought desirable to accommodate that of ordinary character, such as city passenger cars with dummy engines, the various descriptions of vehicles, and also to afford ample space for pedestrians.

The *Canadian Illustrated News* of the 12th of February, which contains a view of the proposed bridge, gives also full particulars.

Leaving the level of the ground on the line of Sherbrooke-street, it is carried as a viaduct east of and parallel with Colborne-avenue, at a level of 90 ft. above the surface of the ground, in spans varying from 150 ft. to 200 ft. each. Striking the navigable channel of the River St. Lawrence, near Molson's Brewery, it passes over to St. Helen's Island with six spans. The bottom of the superstructure will be carried level from Sherbrooke-street to the centre of St. Helen's Island, there meeting the natural surface of the ground. This will give a clear headway of 130 ft. above summer water-level in the harbour, or say 120 ft. above winter level. (The latter figure is the height of the Britannia Bridge above mean tide level, determined by the British Admiralty as a suitable elevation for navigation purposes). Reaching St. Helen's Island, four spans of 240 ft. each will carry the bridge to the height of land, where this first section will terminate. From the south side of the island the second section of the bridge will be carried over the unnavigable channel of the St. Lawrence to the south shore by twenty-one spans of 200 ft. each, grading down with an inclination of 1 ft. in 100 ft. Reaching the south shore the bridge becomes again a viaduct, of five additional spans of 200 ft. each, or until the superstructure has approached within such a distance of the natural surface of the ground as to make embankment more economical; and thence proceeds with ordinary grading to a junction with the Montreal, Portland, and Boston Railway, and also the Grand Trunk.

The total length of the bridge and viaduct will be 15,500 ft., or within a fraction of three miles; and the extreme distance covered from the point of departure from the Quebec, Montreal, Ottawa, and Occidental Railway on the Mile End heights, to the junction with the line on the south side, will be 5½ miles.

The iron superstructure from end to end will be composed of four independent longitudinal ribs, or open lattice girders, placed certain distances apart, and strongly connected laterally.

These ribs will be provided with the usual friction rollers on each alternate pier, to provide for expansion and contraction. Between the two inner girders, on the lower floor, will be a span of 18 ft. to accommodate two tracks for trains of city cars, to be drawn by dummy engines. Between the two inner girders and outside girders, on each side of the bridge, will be spaces of 14 ft. respectively, for ordinary cart and wagon traffic, passing in one direction on the western, and in the opposite direction on the eastern side of the bridge. Exterior to these two outside girders will be footwalks, firmly supported on brackets of iron, strongly attached to the side girders and floor beams; they will each possess a width of 8 ft., and be provided with ornamental railing for the protection of pedestrians.

At a distance of 15 ft. above the lower floor will be placed a second one, strongly connected and braced with iron kelsons and gussets to the longitudinal girders; on this floor, between the two iron girders, will be placed a railway track, with crossing arrangements for trains at St. Helen's Island. The spaces existing between the inner and outer girders will each possess the width corresponding to the carriage-ways below, and are intended for carriages and other vehicles requiring a higher rate of speed than carts or wagons. Should a second track ever be required for railway purposes, across the entire length of the river, a fifth girder can be erected on the up-stream side of the bridge, and be supported by iron columns from the saddles of the ice-breakers, at a comparatively small cost.

The entire height of the bridge from the surface of the water will be 210 ft. for the centre span, or 250 ft. from the foundation.

Carriages and carts will have access to or departure from the bridge on the level of Sherbrooke-street, and possibly at some suitable points between that street and the river, by means of incline approaches. Pedestrians or those wishing to take the city cars will also ob-

tain access to the bridge in this manner. The total cost of the bridge is estimated at 5,000,000 dollars.

The superstructure has been designed for carrying the following live load under a co-efficient or factor of safety of six; in other words, the weight of live load to be presently mentioned, including the weight of the bridge itself, is but one-sixth of the ultimate strength, or actual breaking-weight of the structure.

1. A train made up of locomotive engines, running thirty miles per hour, equal per lineal foot to 2,500 lb.

2. Two trains of city cars, with dummy engines loaded with passengers, going six miles an hour, say 2,500 lb.

3. Carriage-ways and foot-walks, loaded at 100 lb. per square foot, equal to 7,500 lb.

Making a total of 12,500 lb. per running foot, or, divided into the four girders, will make each one carry, in addition to its own weight, about 3,100 lb. per running foot. Mr. Charles Legge, C.E., is the engineer.

COATS OF ARMS, LEICESTER MUNICIPAL BUILDINGS.

IT is said to be the intention of the Town Council in Leicester to place in one of the windows of the new Municipal Buildings the coats of arms of all the gentlemen who have filled the office of Mayor of Leicester since the year 1837. As this will be an official act of the municipal body, and the insignia inserted in the window will remain there probably for generations, it has been properly urged that the armorial bearings should in each case be duly authenticated by the officers of the Heralds' College. If not, what check will be provided against the uninformed presumption of persons whose vanity may outweigh their scruples as to the honourable course in this respect? Should the Town Council permit the insertion of coats of arms without due evidence and authority, they may unwittingly countenance impostare, and the exhibition will become ridiculous in the eyes of well-informed persons.

Coats of arms ought only to used by those persons who are descended from families which were entitled to them before the date of the foundation of the Heralds' College in the reign of Richard III., or by a grant of arms at a subsequent date, obtained from that College. Any male descendant from an original grantee is entitled, after any lapse of time, to resume the family escutcheon, if so disposed. Strictly, however, no other person is justified in pursuing the same course,—not even a brother or cousin of the grantee. In the case of families recently enriched by commerce or manufactures, it is not uncommon for the heads of such families to procure grants of arms from the Heralds' College. These may be obtained at an expense of about 80*l.* in each case.

CHAPEL, VICARS' CLOSE, WELLS, SOMERSET.

THE interesting structure at the north end of the Vicars' Close, Wells, which consists of the chapel (formerly attached to the College of Vicars Choral), the work of Bishop Ralph de Salopia, and the library over it, probably the work of Bishop Beckington, has been lately restored handsomely. It had long been felt that the Theological College at Wells (almost the earliest of such institutions) ought to possess a chapel of its own, instead of using that attached to the bishop's palace. Some three years since the opportunity occurred of obtaining (on fifty years' lease) the above chapel, which for some time past had existed in a melancholy state of dilapidation, mouldy and dusty, the Vicars Choral being only obliged by their charter to have service there once a year. The total cost of the restoration (upwards of 1,000*l.*, including painted glass, &c.) has been borne by past and present students of the college, with the help of a few others. In size the building is very small, *i.e.*, 21 ft. 7 in. by 14 ft. 8 in., and is well delineated in Pugin's "Examples of Gothic Architecture."

Externally, the works of restoration may be thus briefly described. The ground has been excavated on the north and south sides, to relieve the excessive dampness, a dry area formed on the north side, and the plinth fully exposed to view on the south; the plaster and rough-cast removed (being not original), the joints of the stonework raked and pointed in Portland cement. The windows, south doorway (with its charming Mediæval handsome oak door), buttresses, and general ashlar facing, have been repaired where necessary, as well as the elegant embattled parapet and canopied niches on the south side, together with the gabled bell-turret.

The east window of the chapel (formerly blocked up) has been opened out. All the windows have been reglazed, several of them in painted glass, the Mediæval material worked up with the new, by Messrs. Clayton & Bell. The subject of the east window is Christ giving His charge to the Apostles to preach. The old stone altar-slab has been relaid under a new oak table, and an encaustic tile pavement put to the sanctuary. The ancient screen at the west end of the chapel has been repaired and added to, and wrought-iron gates are to be placed there. The original stalls have been replaced. The elaborate panelled oak ceiling has been repaired and strengthened. The whole of the internal walls have been replastered, and a scheme of coloured decoration, prepared by Messrs. Clayton & Bell, will shortly be carried out. A new fireplace, of handsome design, has been inserted in the north wall of the library, having an ornamental chimney-shaft, in character with those in the Vicars' Close. The roof of the library, too, formerly flatly ceiled, has been opened out and repaired.

The works have been carried out by Mr. G. P. White, of Vauxhall Bridge-road; Mr. Ferrey, F.S.A., being the architect.

PIECE-WORK.

AT the Artisans' Institute, last week, a discussion on "Piece-work,—Is it desirable under any conditions?" was resumed. The Rev. H. Solly presided, the workmen present numbering about 150. Of employers there were present, among others, Mr. Peter Graham, Mr. Hunter Donaldson, of Messrs. Gillow & Co., and Mr. Howard. The president moved the following resolution:—"That in certain trades, and under the management and supervision of a joint committee, composed of masters and workmen, piece-work may be advantageous to all parties by giving to diligence, strength, and skill their legitimate reward, and by increasing the amount of production, which benefits alike the public, the employer, and the workman himself, as one of the public and a customer. But without such a committee it is liable to great abuse, tending to deteriorate the quality of work and the health of the worker, to foment jealousies, and unduly to bring down wages both in piece and day work."

An amendment to the above resolution was proposed by Mr. Weiler, cabinet-maker, and Mr. Godfrey, compositor, as follows:—"Seeing that no sound argument has been advanced to show that the system of piece-work is advantageous to the working classes and the general public, and seeing that the system has most injuriously affected those trades where it has been generally adopted, the meeting declares its preference for the principle of day-work." After a brief discussion, it was determined not to put either the resolution or the amendment to the meeting, it being thought that neither exactly met the case, and an adjournment took place.

FINE FEATHERS MAKE FINE BIRDS.

IN the course of a paper on "Ostrich Farming," read by Mr. Simmonds at the Society of Arts, it was stated that the export of feathers from Morocco was, in 1871, 59 cwt., 17,700*l.*; in 1873, 55 cwt., 18,700*l.* In Tripoli the ostrich feathers are brought from the plateau above the first range of mountains, where the ostriches are hunted down during the hot summer months. In 1865, the value of the feathers exported was 12,000*l.*; in 1866, 7,000*l.*; and in 1874, those sent to England rose to the value of 62,000*l.*, and to France, 37,600*l.*

Passing to the British possessions in South Africa, we find that ostrich farming is already an important branch of agricultural industry in the Cape Colony, and promises to become still more so. When it is understood that the value of an ostrich a few weeks old is 10*l.*, and that its value increases rapidly as it grows older, it will be at once apparent that the successful pursuit of this industry is a very remunerative investment of capital. The advance which has taken place in ten years, both in the price of the birds and of the feathers, will give an idea of the importance which this industry has already attained in the Cape Colony. In 1860, a pair of ostriches six months old could be bought for 10*s.*; now, for one bird alone, a few days after hatching, 5*l.* will be given, and for those of three or four months old, 8*l.* or 10*l.* In 1860, the quantity of ostrich plumes exported was 2,297lb., valued at 19,201*l.*; in 1873 the export was 31,581 lb., valued at 159,677*l.* In 1874, the quantity shipped was even larger.

We paid for ornamental feathers, chiefly those of the ostrich, in 1874, nearly 603,000*l.*; and the value of imports of the past year (not yet published) is probably more. Of this amount about one-fourth in value is re-exported, but close upon half a million of money is a large sum to pay annually for a trivial article like feathers, to minister to the pretty vanities and dainty whims of the ladies.

The elegance of the feathers of the ostrich, arising from their slender stems and the disunited barbs, has occasioned them to be prized in all ages, and they still constitute a valuable article of commerce. There is a singular feature which distinguishes them. The large wing feathers of other birds have always one side unequally plumed, whilst in those of the ostrich the quill is in the middle of the feather plume. This equal balance was probably the origin of the hieroglyphic of the Egyptians, who represented Justice by an ostrich feather.

Ostrich feathers dyed black are required for making funeral plumes for horses' heads, in sets of eleven for the hearse, and sets of six for the lid or coffin-board which is borne on the head of one of the undertakers. These plumes are made of a number of pieces of feathers, fastened on to supports of stout brass wire, which are bent downwards when used, so as to give a graceful fall to the plume. When not in use they are closed up on the centre stem. A full set of these plumes for a funeral is worth 200*l.* to 300*l.*, and they are let out by the makers to undertakers.

The total quantity of ostrich feathers imported into the United Kingdom in 1873 was 85,149 lb., valued at 347,390*l.*, and in 1874, 106,919 lb., valued at 323,669*l.*

NEW METHOD OF FIRING POTTERY.

MR. CHARLES MALPAS, of Tunstall, has patented a new system of firing pottery, bricks, tiles, and other ceramic ware, and for burning limestone. On the 15th ult., Mr. Malpas delivered an address, in the course of which he said a manufactory of six biscuit and eight glost ovens at full work would turn out six biscuit and eighteen glost ovens of ware per week. It took about 17 tons of coal to fire a biscuit oven of moderate size, and about 6 or 7 tons for a glost oven. Six biscuit ovens would therefore take 102 tons a week, and eighteen glost ovens 117 tons, making together 219 tons. The computation might not be absolutely correct, but it was near enough for the purposes of comparison with his own system. He proposed to construct twenty-four small ovens, placed in a ring, and adjoining and connecting. He described the principles on which the ovens would be constructed, and added that there would always be twelve ovens out of the twenty-four in course of firing, and a total of eighty-five ovens of ware a week would be obtained. This, he calculated, would be about equal to six biscuit and eighteen glost ovens of the present kind. The consumption of coal would be 23 tons 15 cwt. for that quantity of ware, against 219 tons 5 cwt. under the present system, showing a saving of 195 tons 10 cwt. per week. His next calculation had reference to seggars. He said at the present time, in consequence of the great height of the "bungs," 3,360 seggars were destroyed per week in a manufactory of eight biscuit and six glost ovens, mainly because the weight of the top of the "bungs" broke or cracked the seggars lower down. There was a total loss by waste of seggars, which he estimated at 6¼d. each, of 91*l.* per week. By his system he believed the cost would be reduced to less than one-half that amount, as his ovens would not be more than half the height of the present ovens. There would also be a great saving, both in seggars and wear, by a uniform distribution of heat. He proposed to occupy the interior circle with warehouses and workshops, and this would be a gain both of time and labour. He intended glost and biscuit firing to be going on both at the same time, and this would lead to a despatch in the execution of orders quite impracticable under the system now in use. There would also be a

great saving in the first cost of the ovens, and in the expense of keeping them in good repair. Lastly, the new system would put an end to the smoke-nuisance, so far as the firing of pottery was concerned.

NATIONAL FEDERATION OF EMPLOYERS.

THE second annual meeting of the members of this federation was held on the 25th ult., at the Westminster Palace Hotel; Mr. John Robinson, of Manchester (president of the Association), in the chair. Amongst those present were Sir Thomas Bazley, M.P., Mr. R. Heath, M.P., Mr. J. P. Corrie, M.P., Mr. W. B. Harrison, Mr. Richard Hayworth, Mr. Benjamin Hannen (chairman of Council), Mr. W. Sully (of Nottingham), Mr. Walter Ainsworth (Bolton), Mr. J. T. Smith (Barrow-in-Furness), and Mr. Peter Graham (Messrs. Jackson & Graham.)

The report contained the following paragraph: "The abolition of piecework already occupies the public mind upon the demand of the Amalgamated Society of Engineers, and a fund of 260,000*l.* is stated to be at its disposal for any purpose sought to be effected by its members. This suggests a reference to the gross injustice that money contributed by members against sickness and death should be squandered upon an industrial warfare. It seems to your committee that the time has arrived when there should be enforced, by legislative measures, a distinction between strike funds and benefit funds, so that persons who have contributed to the latter may have a legal claim upon them. At present a system of terrorism is practised, for men who have long contributed to benefit funds naturally shrink from forfeiting what they have saved by disobeying the edict of a committee, however much they may disapprove it."

The president, Mr. B. Hannen, Mr. Fisher Smith, of Dudley, Mr. Graham, Mr. Haworth, Mr. Morris, of Halifax, Mr. Thornton, of Nottingham, Mr. Jackson, of Blackburn, and Mr. Wilson, of Leeds, having spoken,

A vote of thanks was given to the Executive Committee for the zeal and ability with which they had discharged their duties during the past year; and the officers having been elected, the meeting closed with the usual compliment to the chairman.

ROUGH ESTIMATE NOT BINDING.

THE VESTRY OF ISLINGTON *v.* FREEMAN.

IN this case, heard in the Clerkenwell County Court on the 17th ult., before Mr. Gordon Whitbread, the Vestry of Islington claimed from the defendant the sum of 1*l.* 19*s.* 6*d.*, the balance of cost of making a new drain to the house, No. 1, Suffolk-street, Rotherfield-street.—Mr. Layton, vestry clerk, appeared for the plaintiffs. The defendant did not appear, but Mr. James Pope, builder, of Newington-green, who said he had the work in hand of making the drain, appeared for him.

The proceedings were taken under the provisions of the Metropolis Local Management Act of 1856.

In the first instance the cost of making the drain was estimated at 3*l.* 14*s.* 6*d.*, which was paid by the defendant, but on the completion of the work it was ascertained that the actual cost was 5*l.* 15*s.*, and the defendant having refused to pay the balance of 1*l.* 19*s.* 6*d.*, the present proceedings were ordered to be taken by the Vestry.

Mr. Charles Higgins, surveyor of sewers, &c., to the Vestry, stated that in consequence of complaints made as to the sanitary condition of the house, the drain was examined, and found to be defective, and a new drain was ordered to be made to the house. The distance from the house to the main sewer was supposed to be 20 ft., and the estimated cost of 3*l.* 14*s.* 6*d.* was made for that distance, but on the completion of the work it was found that the cost was 5*l.* 15*s.*, in consequence of the greater distance than anticipated of the main sewer from the house, and that was the sum which the Vestry would have to pay to the contractor for general sewer works.

Mr. Pope, for the defendant, said the Act of Parliament did not apply to a case like that where the work was done by a contractor for the parish. The estimate having been given for a distance of 20 ft., he contended that the parish were bound by it, and that to call upon the defendant now for the difference of cost was not the way in which a great parish like that should do its work. He had given in his estimate to the defendant of the cost of the work, founded on the distance being 20 ft., and the Vestry should be bound by the contract being for that distance.

Mr. Layton said Mr. Pope did not do the work, nor had he anything to do with it.

His Honour said that he could not see that the estimate was a binding contract for the work. It was not a special contract, but only a rough estimate.

Mr. Layton said they could not in all cases tell beforehand the exact cost, and when they received too much they paid it back. The Vestry got nothing by it.

The Judge gave judgment for the plaintiffs, but thought it not a case for the cost of witnesses.

NUISANCE CAUSED BY BRICKBURNING.

BUFFY *v.* STEVENS.

THIS was a suit to restrain an alleged nuisance from brickburning, and came before the Master of the Rolls on the 18th ult.

The plaintiff, Benjamin Buffy, was a platelayer, residing at Wimblebury, near Hednesford, and in 1868 erected his house on ground he had purchased. The defendants, Charles Stevens and William Thomas, were the owners of a plot of ground opposite the plaintiff's house, and in June, 1874, they commenced to use it as a brickyard, erecting a brickkiln within thirty yards of the premises of Buffy, who alleged that the smoke and effluvia therefrom was blown across the street, to his great annoyance and the injury of his house, furniture, and garden.

The defendants contended that as the village of Wimblebury was in the Cannock Chase Coalfield district, and possessed nothing of a rural character, the plaintiff could not prevent auxiliary works being carried on there, and, in fact, the place was only a collection of habitations occupied by people employed in the adjoining brickyards and collieries. The plaintiff himself was in the employment of the Wimblebury Company, whose brickyards were within 200 yards of his house, and emitted large quantities of smoke and effluvia.

His Lordship said there was really no defence to the case. The plaintiff and his neighbours proved that in summer time they had to keep their windows shut in order to keep out the smell and smoke, and were generally made uncomfortable by the defendants' brickyard. In answer to this no specific evidence was offered. A perpetual injunction was granted against the defendants, with costs.

COMPENSATION CASE.

SCHLEISCHER *v.* METROPOLITAN BOARD OF WORKS.

THIS was a compensation case, assessed by the magistrates under the 121st section of the Lands Clauses Act, in respect of the New Gun public-house, Wapping High-street, the same being required for the widening of that thoroughfare. The claimant held the premises under the usual brewer's agreement, subject to three months' notice to quit. Messrs. Fuller & Fuller, surveyors, were instructed by Mr. J. Webber, jun. (Dyers' Hall), Mr. Schleischer's solicitor, to prepare the claim, but no agreement was come to by the Board or any offer made. The profits from the business were agreed at 600*l.* per annum, and Mr. G. Fuller and other surveyors gave evidence to the effect that the claimant was entitled to two or three years' profits for compulsory removal; the Board, on the other hand, argued that the magistrate should only award at the most three months' trading as compensation. The magistrate, in delivering judgment, observed that the evidence given by the surveyors for the claimant had not been rebutted by evidence on behalf of the Board, and he awarded the claimant 1,650*l.* for compensation according to the Act, and further allowed the claimant a sum of sixty guineas towards his costs in the matter.

ARBITRATION CASE.

HOPSON *v.* LONDON SCHOOL BOARD.

THIS was an arbitration, held at the Surveyors' Institute, before Mr. G. Prickett as umpire. Mr. E. F. Fuller (Fuller & Fuller) represented the claimant, and Mr. Robson was appointed arbitrator on behalf of the Board. The claim was in respect of two houses known as Nos. 114 and 116, Rhodeswell-road, Limehouse, held for an unexpired term of 79½ years, at a ground rent of 7*l.* per annum; and the houses were let at 30*l.* a year each, the landlord paying taxes and doing repairs. Mr. Hopson's surveyors valued the property in question required for the enlargement of the school at from 650*l.* to about 670*l.*, whereas the Board did not call any witnesses. The umpire's award has since been received, and the amount given is 518*l.*

BORAX IN PASTE.

SIR,—Architecture being greatly indebted to Bibliomania, whereby many ancient views of buildings daily re-appear to us in London, I should feel greatly obliged to many of your readers who are interested in the preservation of ancient views and books, whether a small quantity of borax added to paste will in anywise impair its efficacy by discharging printing-ink, or affecting the paper, as much ancient-made paper is under-sized. The thought has just struck me, and is worthy attention of all interested.

PERFORATUS VERAX.

ECCLESIASTICAL DILAPIDATIONS.

AT an adjourned conference of the members of the United Deaneries of Bath and Keynsham, held at Bath a few days ago, the subject of ecclesiastical dilapidations was discussed. As at most clerical conferences on the subject, all the speakers agreed that the diocesan surveyors exercised their powers under the Ecclesiastical Dilapidations Act somewhat arbitrarily. The Rev. Canon Brooke, who introduced the subject, said,—

He brought it forward in consequence of what had taken place at Axbridge, where the diocesan surveyor made this order as to repairs in the chancel:—"The four-light window in the east wall, with the tracery in head of the same, should be repaired and properly made good, filling the openings with glazed and leaded quarry lights as originally. This will necessitate the removal of the Corinthian columns and entablature in the interior, together with the woodwork at sides, now partly decayed. The stucco of the walls of interior to be then made good." The real matter was this: there had been a reredos put up 150 years before, and what was ordered was not simply the repair of that reredos, but its entire removal and the substitution of another, according to the ideas of the surveyor of what had been the original; the reredos having existed for 150 years, it had been received by the outgoing incumbent in the state in which it now was, and now he was required to take it down and put up another one according to the surveyor's opinion of what it should be. There was another case—the Paulton case—in which an order was made for various things that never before existed; things which had been done by the tenant were ordered to be carried out by the incumbent, and other matters dealt with on the same principle. These were not singular instances. In one case, a house was roofed with tiles, more or less decayed, but as all the other houses in the street were covered with slate, a similar material had to be put on the house in question. He held that the surveyor had no business to order such a thing; the question was what the roof had been, and it was a distinct case, not of substantial repairs, but of an improvement. Another instance was the taking up of an elm floor, the surveyor thinking an oak one would be better, which he (Canon Brooke) thought was not a repair, but an improvement. If they were to admit such changes as those, they would impose upon the clergy a burden that would become simply unbearable. Under such circumstances as those, the clergy of Axbridge deanery had passed a resolution, "That a committee of this meeting be appointed to draft cases, to be reduced to formal shape by a solicitor, with the view of obtaining counsel's opinion thereon." He thought that all interested in the matter ought to take some action to join with their brethren in the Axbridge deanery in the course they proposed, and concluded by moving, "That this conference concurs in the resolution of the incumbents of the Axbridge deanery to take counsel's opinion as to the legal power of the diocesan surveyors of ecclesiastical dilapidations to order improvements as well as repairs on glebe property, and requests the rural deans to communicate with the rural dean of Axbridge on the question, and report to a further meeting." This resolution was carried.

PATENT VENTILATION.

AT a meeting of the London School Board, February 16th, a report from the Works Committee contained the following:—

"The committee have to report that the system of ventilation patented by Mr. Tobin has been adopted in many of the Board schools with great advantage. Mr. Tobin, however, has now brought an action against the Board and claimed 5,000*l.* for an infringement of his patent. In view of the substantial benefit received by the use of it, the committee have thought it right to make an offer of 250*l.* in preference to being involved in litigation, which, whether successful or unsuccessful, could only be conducted at considerable cost. For the above amount Mr. Tobin has agreed to give the Board a licence to use his system of ventilation in all buildings at present owned or occupied, or which will in future be owned or occupied, by the Board, and also to grant indemnity for the use already made of the system by the architect of the Board. The committee accordingly recommend that their offer be confirmed."

This was confirmed by the Board. Some of our correspondents who deny Mr. Tobin's right to a patent will not be pleased with this.

KNIGHTSBRIDGE BARRACKS.

AT the meeting of the Metropolitan Board of Works last week the Works Committee recommended that the Board do, subject to the passing of an Act of Parliament, agree to pay a sum of 5,000*l.*, in consideration of the surrender by her Majesty's Government of a strip of land forming a portion of the ground at present occupied by the Knightsbridge Barracks, for the purpose of widening the road at that point, the Board, in addition to the payment of the above sum, undertaking the work of making up the roadway.

Mr. Richardson, in moving the adoption of the report, said that the Government were willing to give up a space of 8,900 ft. for the sum of 5,000*l.* The land in question had only been valued at the price of garden land and not building land. If the space in question were thrown into the public way, the Government could not build the new barracks on the limited site, so that they would be compelled to purchase other property at a cost of 25,000*l.* Therefore it was only fair and reasonable for the Government to ask the Board to pay the sum of 5,000*l.* for the land to be given up.

General Sir William Codrington moved,—"That the proposal of her Majesty's Government for this Board to charge the ratepayers of London 5,000*l.*, either for improving the boundary line of Knightsbridge Barracks, or for the widening of the high road at that spot, or for the purchase of house property opposite the barracks, be not agreed to; and that the question be referred back to the committee for further consideration." He said he felt surprised at the Government asking 5,000*l.* for this slip of land. It was the duty of the Government to throw the same into the public way, and not tax the ratepayers for it.

On a division, the amendment was lost by 23 to 13, and the report of the committee adopted.

ERRORS OF LEVELLING.

THE INSTITUTION OF CIVIL ENGINEERS.

On the 22nd of February, the paper read was "On the Probable Errors of Levelling, with Rules for the Treatment of Accumulated Errors," by Mr. Wilfrid Airy, B.A.

It was stated, with respect to genuine errors of observation, that in most engineering works it was unnecessary to give much attention to the small discrepancies between the results arrived at by different observers; but, in the case of a complicated system of long lines of levelling, the aggregation of small errors became formidable, and the proper treatment of them required considerable method and skill.

Errors of levelling were of three kinds:—(1) Mistakes; (2) instrumental errors; and (3) errors of observation.

In considering the question of dealing in a satisfactory way with the adjustment of the levels on a complicated system of lines, it occurred to the author to frame tables of probable errors, such as would be applicable to the circumstances of the different lines of the system. The data for framing such tables would be drawn from the official records of standard levelling in different countries, and the value of the tables when framed would depend in a great degree upon the mass of statistics which were reduced in order to compile them.

A critical examination of the discrepancies between observers on the same lines of levels, showed that the average amount of the discrepancies depended very much upon the inclination of the ground.

"THE DEGRADATION OF THE PAINTER ON GLASS."

SIR,—A letter with the above heading appeared in the *Builder* of February 19, in which our names are mentioned, in connexion with an action we brought against a noble lord, and which was given in our favour by Sir Frederick Pollock. It was for a rather considerable amount of heraldic glass executed by us for Lord Beaumont's seat in Yorkshire, and illustrating the heraldic history of his family from the time of the Crusades. Being heard in chambers, no public report was printed; but we think it fair to the writer to say his account of the evidence appears substantially correct. We write from memory only; but the notes taken by the shorthand writers at the trial would confirm it if correct. The whole case turned upon the unreasonableness of estimating small and delicate painting suitable for a drawing-room (some of the coats containing ten and eleven quarterings), necessitating finished artists for its execution, at the same price per foot as the large work required for a hall or public building. We are not acquainted with the writer of the letter in question, but we think it will be indeed an evil day for glass-painting as an art when the painter himself subsides into a mere servile tracer of other men's drawings, however good they may be, and every spark of feeling in his art,—which is the essence of its worth,—is stamped out of him. To seek for and encourage the last-mentioned gift is, we think, the great duty of employers, and it will not fail to be responded to, and to eventually raise the standard of the work and the producer of it also. Commercially, we well know, it is not so advantageous as the commodity largely manufactured and sold by the square yard; but in the end, it yields far greater satisfaction to all concerned. Our wish to do justice to a comparatively small but most deserving class of men must be our apology for this communication.

O'CONNOR & TAYLOR.

EDUCATION OF BRICKLAYERS.

SIR,—In my last, I endeavoured,—however imperfectly,—to explain what, in my opinion, are the causes which lead up to, and perpetuate, the lamentable state of affairs that has given rise to this discussion. With your permission, I will now venture a few remarks, by way of comment, upon the remedies proposed by your correspondent, trusting that what I may say upon the subject may be taken in good faith,—not as an endeavour to undervalue his evidently good intentions, but rather as an earnest desire that the movement may take some practical form. In introducing his propositions, he says there are a class of men who would object to any movement having for its object the improvement in education and skill of those of their fellows who unfortunately are not so well informed as themselves. Now, I fail to see the force of this argument, for are they not, as I in my last letter explained, all, by a uniform rate of wage, put upon a pecuniary level? And as they offer no objection to these, their less-informed brethren, being levelled up to their standard of pay, surely they cannot consistently object to a nearer approach in intelligence and skill. Moreover, having a good start in advance of them in this respect, would they be worthy the name of intelligent men if, like the hare in the fable, they stood still while the tortoise passed them in the race? Again, if this movement is once set in motion, these very men will be scarcely able to resist the temptation to take a part in it, and they would be amply rewarded by a fuller development of their own knowledge, exactly in proportion as they used it in imparting instruction to others.

That the time in the lodge-room should be utilised for educational purposes, I quite agree; that, in my opinion, is the best use the lodge-room could be put to; but it must be borne in mind, in reference to this discussion, that there are a number, and I may say a large number, of bricklayers who are not members of a trade-union lodge: therefore, for this movement to be successful, some common ground must be chosen whereon all society and non-society men alike can meet on equal terms, because the principal element of success is to be found in the co-operation of, and the assistance to be rendered by, those bricklayers who, having not only made themselves masters of the art, have also acquired the intelligence and capability necessary to enable them to impart instruction to others; and as many of these men repudiate any connexion with the union, it is not likely they would lend their aid to a movement having for its object the improvement of lodge members only. Again, supposing in the ranks of the union a sufficient number of such men were to be found, and the movement by their aid were set in motion, and drew to the lodges,—which doubtless to a certain extent it would do,—those non-society men in search of instruction, what guarantee have we that the union leaders, having been placed in power through their proficiency in the art of agitating, not by a superior knowledge of the art of bricklaying, would be prepared to adopt a new platform? Would they not be rather tempted to use the increased strength derived from the additional number in still further pushing their old favourite policy of aggression? In which case the educational programme would inevitably become a dead-letter.

In reference to the subject of masters for the schooling,—or what I should more correctly designate the mental teachers,—it cannot be too clearly understood that the intended pupils are not children; because, if schoolmasters are selected whose business has been to teach children only, no greater mistake could be made. Many well-meant attempts at adult education have failed for this very reason: in teaching a man he must be treated as a man, or he will turn from his teacher in disgust. I am led to make this remark by the letter of your correspondent, Mr. Chessel (*vide* Jan. 29), wherein he laments the failure of his laudable endeavours to draw workmen to school; that he should fail to draw bricklayers, unless he were himself a bricklayer, is almost a matter of course. A bricklayer, such a one as I previously described, with the drawing-board and implements for practically describing the technical details of his craft by diagram, as suggested by Mr. Morris, would draw more pupils and engage more attention, than a dozen mere schoolmasters, however earnest in their work they may prove to be.

To the suggestion that architects would, if invited, join in the movement, I would remark that most likely some architects would gladly avail themselves of the opportunity to extend their knowledge of brickwork, by assisting at meetings of an advanced class of bricklayers, discussing the theory and practice of it; or to encourage by their presence at, or even lend their aid to, a drawing-class; but it would be forming a very low estimate of their educational attainments to expect them to join a class of uneducated bricklayers, met for mutual improvement in the rudimentary stages of the three R's.

Upon Mr. Houghton's letter (*vide* January 8th) I have but little new to say, as the matter contained therein is so nearly an echo of what has already been said; but there is one statement which calls for rather more than a passing remark. I allude to the statement touching clerks of works and builders' foremen,—a body of men hitherto considered to be the *élite* of the building trade,—a body with whom Mr. Houghton is not ashamed to identify himself. As one of that body, to which I am proud to belong, I beg to say, with all humility,—what may be truly said by all,—there are none perfect, no not one. But the best answer to the statement lies in the fact that these men receive their appointments in the one case, as a rule, by the architect, and in the other invariably by the contractor; and it is a poor tribute to their discernment to insinuate that the men appointed by them are wanting in the ability to read and write, or even to accomplish a bit of drawing,—setting aside the practical acquaintance with at least one branch of the building trade.

A BRICKLAYER CLERK OF WORKS.

CARRYING TOOLS.

SIR,—I have travelled some thousands of miles through Britain, Ireland, Canada, and the United States, and have seen some thousands of workmen, comprising ship carpenters, house carpenters, locksmiths, painters, &c., going to and returning from work, carrying tools, kits, &c.

Amongst that number in all of the above countries, I have never seen more than about one in a hundred carrying his tools in a scientific manner. The usual way in which most workmen carry their tools is to make a lever of an adze, an axe, a hammer, or a piece of rope; pass one end through the handles of the kit; shoulder it, and pull down with the hand in front to counterbalance the weight of tools behind. Supposing the kit and tools weigh 20 lb., then they have a weight of 40 lb. pressing on the shoulder; for it takes a force of 20 lb. to counterbalance a weight of 20 lb.

If the tools were placed in two small kits, joined by a leather strap passed over the shoulder, 10 lb. in front would counterbalance 10 lb. behind. Thus only 20 lb. would press on the shoulder instead of 40 lb.

McDUFF.

CHURCH BUILDING NEWS.

Privett.—At a meeting recently held at Privett, near Alton, the offer of Mr. William Nicholson, of Basing Park, to erect a new church at Privett, on the site of the present dilapidated building, was accepted. Mr. Blomfield, of London, is the architect, and the design includes a spire some 160 ft. high.

Uxbridge.—St. John's Church, Uxbridge Moor, has recently been much altered and added to, the principal improvement being the construction of a chancel. This has an open roof of stained timber, and is paved with Minton's tiles, while the windows are filled with stained glass. The seats in the body of the building have been rearranged and made open, there being now a centre aisle, instead of passage-ways at the sides as formerly. The walls have also been redecorated. The work was entrusted to Messrs. Fassnidge & Son, of St. Andrew's.

Hooton Pagnell.—The Church of All Saints, Hooton Pagnell, has been re-opened, after being closed for thirteen or fourteen weeks. In the interval the whole of the interior has undergone restoration and improvement. A new flooring has been substituted for the old and decayed one lately existing. The old high-backed seats have been removed, and in their stead have been introduced pitch-pine stalls. The old-fashioned galleries have been taken down, and by this arrangement two ancient and well-formed arches have been brought into view. The architect is Mr. J. M. Teale, and the contract was intrusted to Messrs. Shillitoe & Morgan, of Campsall. The contract for the supply and the laying of the new heating apparatus—the cost of which was nearly 100*l.*—was given to Mr. England, of Pontefract.

Kingston.—A new church for the district of St. Paul, Kingston-hill, Surrey, is about to be commenced. The building committee have accepted the plans of Messrs. Luck & Rushforth, architects, London. The church is to be in the Gothic style, and built of stone and Kentish rag, and is to consist of a chancel, transepts, nave, and two aisles, with a central tower. The accommodation is to be for 784 persons, the cost

of the entire building being estimated at 7,000*l.* The accommodation to be provided by the different parts of the church, taken independently, is as follows:—Chancel and transepts, 160; nave, 304; nave and north aisle, 458; nave and two aisles, 624.

Farsley.—St. John's Church, Farsley, was re-opened on the 2nd ult., after restoration and enlargement. The old painted pews in the body of the church have been cleared away, and open seats in solid oak substituted. New choir-stalls, lectern, reading-desk, and pulpit, all in oak, also contribute towards the improvement which has been effected. The roof has been underdrawn with diagonal boarding, stained and varnished, and the walls round the area of the church are also boarded up to the window-strings with pitch pine. At the tower entrance an inner porch in pitch pine has been added, and at the north-east corner of the nave an organ chapel, with a richly moulded arch of Early English character, has been erected. The various works have been executed under the supervision of Messrs Peterson & Thompson, architects, of Bradford; the contractor for the interior work being Mr. George Trickett, of Bramley, and for the stone work Messrs. Laycock & Turner, of Farsley. The cost of the entire works has been about 1,500*l.*, inclusive of the organ.

Bridlington.—A meeting was recently held at the Town-hall, Bridlington, for the purpose of opening a subscription for the restoration of the Priory Church. The Archbishop of York presided, and explained that it was proposed to restore the western front, and to erect a tower or towers, as funds permit, according to the plans of Sir Gilbert Scott. Towards this object the Rev. Y. Lloyd Greame has already offered 1,000*l.* on condition that at least 2,000*l.* be raised by September next. The estimated cost of restoration is 10,000*l.*

Hythe.—The parish church of St. Leonard, Hythe, was re-opened on the 23rd December, after restoration under the superintendence of Mr. G. E. Street, R.A., architect. The galleries over the north and south aisles have been taken down, and also the gallery at the west end, so that the simple beauty of the nave is now exhibited, together with the exquisite Early English chancel. The view from the west end up to the altar, which rises thirteen steps from the nave, is very striking. The church has been re-seated throughout with open sittings. In the south transept, the low ceiling has been removed, the roof gabled, and a new lancet window introduced. A great part of the floor has been laid in Minton's tiles, worked into a variety of patterns. A new carved pulpit has replaced the old wooden one.

Stow.—The new Scotch Presbyterian Church at Stow, near Galashiels, has been opened. The church is Early Decorated in style, and has an area capable of seating 800 persons, although only 700 have been provided for. The building consists of a nave 31 ft. broad, with cross transepts, and terminating with apsidal end, the total length being about 100 ft. There is a north side-aisle, and a small gallery, vestry, and ladies' room. The north porch, in which is the principal entrance, is surmounted by a tower and spire, upwards of 140 ft. in height. The walls are faced with red freestone, in courses (rockfaced), with dressings of Prudham freestone of a warm cream tint, polished and carried through all the window and door openings, showing solid masonry round them in the interior as well as the exterior of the building. The pillars of the aisle, and every alternate stone of the jambs and arches of the door and window openings, are of fine-grained freestone. On the wall at the back of the pulpit there is some Gothic wood-panelling by Davidson & Reid, Edinburgh. The stone carving on the capitals of the aisle pillars, roof corbels, &c., is by Messrs. Farmer & Brindley; and the floors of the passages and porches are laid with Minton's tiles. The gas-fittings, of polished brass, and very effective, are by J. Milne & Son, Edinburgh. In the tower, a clock and bell, the gift of Captain Tait, of Pinn, have been fitted up by J. Ritchie & Son, Edinburgh; and a complete system of warming by Perkins's hot-waterpipe apparatus has been carried out by Mr. Charles Ritchie, Edinburgh. Messrs. Wardrope & Reid were the architects; Messrs. A. Herbertson & Sons, Galashiels, builders; and Mr. Thomas Gordon acted as clerk of the works.

Llanvair.—The parish church of Llanvair, near Usk, has lately been re-opened, after having been almost entirely rebuilt, under the direction of Mr. J. D. Sedding, architect. The church had fallen into a lamentable state of decay, and, with the exception of a part of the north wall of the nave, the whole church has been rebuilt. The other works included in the restoration are an entirely new nave roof, the old roof having been a flat ceiling of the Georgian period; an extension of the church which will give accommodation to fifty more persons than formerly; a thorough renovation of the chancel roof; new traceried windows; new pavements; new chancel and nave seats; and a new pulpit. The chancel roof is of oak, with moulded ribs, and bosses at the intersections of the principals. The reredos is of alabaster, with traceried niches and carved panels, and the alabaster-faced work extends through the whole width of the east wall, having a plinth of glazed green tiles, which has a very beautiful effect. The chancel seats are of oak, with open cusped panels. The pulpit is of oak, and has sculptured upon it the figures of the four Evangelists. In plan the church is a simple nave and chancel, with a new organ-chamber and vestry on the north side of the chancel, and a new south porch. The restoration has been effected in the style of the fifteenth century, from which period the old church dated. The builder who first undertook the execution of the work was Mr. Lucas, of Usk; but the contract has been completed by Mr. William Bone, of Liscard. The total cost is about 1,400*l.*

Edworth (Bedfordshire).—St. George's Church has recently been reopened, after restoration. The roofs of the nave and aisles are new; that of the chancel has had the plastering removed, and boarded with diagonal boarding. The windows of the aisles, clearstory, and tower, have been restored. The font, which is very old and beautiful, has been restored, and removed from the south aisle to the west end of the nave. The church has been levelled throughout and paved with tiles. The walls of the west end of the entire church have been underpinned. The works have been carried out by Mr. William Osborne, contractor, St. Neot's, from the design and under the superintendence of Messrs. Raynes & Shum.

DISSENTING CHURCH-BUILDING NEWS.

Siddal.—A new Wesleyan chapel has been commenced at Siddal, from designs by Mr. Petty, architect, Halifax. It will be in the Gothic style. On the basement story will be a large school-room and five class-rooms. The chapel, which will have a good approach, will be 43 ft. wide, and 57 ft. long. At one end is an organ recess, with minister's vestry beneath. Over the entrance vestibule will be a gallery for the scholars, whilst the chapel itself will accommodate 400.

Illingworth.—Plans for a new Wesleyan chapel at Halifax have been prepared by Mr. James Farrar, architect, Halifax. The style chosen is Italian, and the front presents an entrance, boldly moulded, with an architrave overhead. On either side the entrance is a window similarly treated. In the second story, in the centre, is a coupled window with semicircular heading. In the rear of the chapel, separate from it, is a house for the chapel-keeper. Internally the chapel will be 62 ft. by 42 ft. All the seats will be open, of pitch pine, varnished, and there will be accommodation for 500 persons. A gallery will run round three sides. The total cost will be 2,500*l.*

Todmorden.—The corner-stones of a new Wesleyan Chapel at Shade, Todmorden, have been laid. The edifice will cost 2,500*l.*, and will accommodate 250 persons.

Dorchester.—The opening services of the new Primitive Methodist Chapel, in Durngate-street, took place a week or two ago. The architect is Mr. S. Jackson, of Weymouth. The builders were Messrs. Davis & Son, of Dorchester. The foundation stones were laid last August. Up to the present time the outlay has been 600*l.*, but it is intended to add a school-room, which will cost 200*l.* more.

Winchester. — Jewry-street Congregational Chapel, Winchester, has just been re-opened, after decoration and improvement, at a cost of 450*l.*, under the direction of Mr. Poulton, of Reading, architect, from whose design the chapel was built twenty-three years ago.

Ivybridge.—A new Wesleyan Chapel has been completed and opened at Ivybridge, Devon. The chapel, the whole cost of which has been defrayed by Messrs. Allen & Sons, is cruciform in plan, and consists of nave, chancel, transepts, with an organ-chamber. At the north-west angle of the nave is a tower, which with the spire is between 90 ft. and 100 ft. high. At the back of the chapel are class-rooms and vestry. The benches, which are open, seat (including the school children) about 550 persons. The chapel is Early Pointed in style, the French rather than the English type having been adopted,—the square abacus frequently occurring. A bold double chamfered plinth of wrought limestone surrounds the whole building. Each of the side walls of the nave is pierced by three double-light arched windows, and the principal façade towards the road has two double-light windows with detached shafts having carved capitals and moulded bases, a moulded circular window occupying the equilateral gable above. Externally all the walls are faced with dark limestone, and the quoins and dressings are of light limestone and Portland stone. The shafts of the pillars throughout are of red Mansfield stone. Internally the chancel and transept arches and the quoins and arches of doorways and windows are chiefly of Bath stone, of which material the pulpit, octagonal in form, is made. The internal woodwork is chiefly of pitch pine. At the feet of the roof principals, and resting on stone corbels, are figures representing (in the nave) apostles, prophets, and martyrs, and (in the chancel) angels with musical instruments. The figures have been executed by Mr. Trevennen, of Plymouth. In four panels of the pulpit are inlaid tiles representing the four Evangelists, made by Mr. Fouracre, of Stonehouse, who has decorated the chancel walls. The chancel window and the windows in the road façade are filled with stained glass in geometrical patterns, supplied by Messrs. Hall & Sons, of Bristol. The chapel is lighted by six coronæ of wrought iron and brass, and two chancel standards, all made by Mr. Singer, of Frome. The building is warmed by a hot-water apparatus, supplied by Garton & King, of Exeter. The font, made by Messrs. Goad, of Stonehouse, is octagonal, and of red Plymouth marble,—polished. Messrs. Blatchford & Son, of Tavistock, are the contractors, who have erected the chapel from the designs and under the direction of Messrs. James Hine & Alfred Norman, architects, of Plymouth.

Exeter. — The South-street Baptist Chapel, Exeter, was recently re-opened, after restoration and extension, from plans by Messrs. Spalding & Knight, architects. Messrs. Stephens & Sons, of Exeter, were the contractors. The total cost is estimated at 3,000*l.*

Banff.—Mr. Wilsone, architect, Aberdeen, has prepared plans for alterations and additions to the Free Church of Banff. Considerably over 1,000*l.* has been subscribed for the purpose.

Portobello (near Edinburgh).—Shortly after the destruction by fire of Regent-street Free Church, the congregation determined to erect a new and commodious building at Joppa. The new edifice was begun about six months ago, and considerable progress has now been made. The building is Gothic in style. Accommodation is provided for 660 persons. A gallery will be erected over the vestibule, but there will be no side galleries. The pulpit will be placed on a platform at the north end of the building. The principal entrance will be from the main Joppa-road, and there will also be side accesses from Hamilton-street. The scaffolding for the erection of a tower, 163 ft. in height, is now being prepared. The cost of the building will be about 8,000*l.* The mason-work is being executed by Mr. A. Wilson, Tranent; and the joiner-work by Mr. H. Scott, Portobello.

Anerley.—A new Congregational church was opened at Anerley recently. The new building is 130 ft. in length, 56 ft. in width, and 41 ft. in height from floor to ceiling. It will seat on the ground floor 780, and in the galleries 510. It is faced with red brick, having white Suffolk brick and Bath stone dressings, the style being Romanesque. Next the high road, and on the south front, are the chief entrances to the church, through arcaded porches and spacious lobbies, while the tower and one gallery staircase entrance are at one corner, and the other staircase entrance at the opposite corner, with a smaller turret. The total height of tower and spire is 159 feet. The roof is in one span. The architects are Messrs. George Elkington & Son; and the builders, Messrs. Thomas Brown & Sons, Upper Norwood. The iron castings were furnished by A. D. Dawnay & Co., while the heating of the building is by hot air by Messrs. Grundy's patent. The cost of the building is 12,500*l.*, including freehold of ground.

Todmorden. — The corner-stones of Millwood new Baptist chapel and school have

been laid. The new chapel will seat 700 people, and in the school there will be accommodation for 400 scholars. The estimated cost is about 3,500*l.*, exclusive of the ground. Messrs. J. Horsfall & Son, of Manchester, are the architects, and the style is Romanesque.

THE WINCHESTER GUILDHALL AND ITS ARCHITECTS.

A SPECIAL meeting of the Winchester Town Council was held on the 25th ult., to consider a series of resolutions, "tabled" by Alderman Forder, condemnatory of the architects, builders, and clerk of the works, with respect to the condition of the above-named building. The essential part of these condemnatory resolutions was embodied in the following clauses:—"And that it having been proved during the recent alterations that the building has not been erected according to the plans and specifications of the architects, and that the contract entered into by the builders has been departed from, and that the clerk of the works has consequently not done his duty, the Corporation considers that the architects, builders, and clerk of the works have each and all of them, in their several positions, signally failed to perform their duty to the Corporation, and have thereby incurred the grave censure of the Corporation of Winchester."

In the course of a long and animated discussion, Mr. Forder spoke in support of the resolution. The question was whether the contract had been properly carried out. The evidence taken, he contended, showed that it was not so.

Mr. E. D. Godwin seconded the resolution, for the sake of discussion with a view to a final decision.

The Mayor urged that the Council had themselves to blame, for the Corporation had endorsed all that had been done, and had appointed their own clerk of the works. They had taken the building over; they had had the expense cut down to suit their own requirements, to the detriment of the plans; and the architects, being young men, consented to what neither Sir Gilbert Scott nor Mr. Street would have done. They had taken the responsibility on themselves, and now they were going to bark without the power to bite,—a most unwise proceeding. The Town Clerk had advised them that they had no ground of action, and advised them not to waste more money on the matter.

Captain Moore supported Mr. Forder.

Eventually the Council divided,—Messrs. Moore, Naish, Forder, and Godwin voting for the resolutions, Col. Rich neutral, and sixteen against them. The Council then separated, thoroughly convinced (according to the reporter of the *Hampshire Advertiser*) that they had tried to get too large a cake for their money, *and had themselves alone to blame.*

"DUSTING AND SLOPPING" CONTRACTS IN ST. PANCRAS.

AT a special meeting of the Highways, Sewers, and Public Works Committee of the St. Pancras Vestry, on the 21st ult., tenders were received for the removal of dust from the houses, road-sweepings, &c., and for the supply of road materials.

For the removal of dust the tender of Mr. Edward Jackson, at the sum of 990*l.*, was accepted, against 800*l.* the last contract, for No. 1 Ward; and that of Mr. Alfred Culverhouse at 891*l.*, against 890*l.* last year, for No. 4 Ward. The tenders for Wards 2, 3, 5, 6, 7, and 8 were so much in excess of those of last year that none of them were accepted, and it was resolved to advertise again for tenders.

For the removal of road-sweepings, &c., the tender of Mr. James Smith was accepted, at 3s. 11d. per load, against 3s. 6d. last year, for No. 1 Ward. For No. 2 Ward that of Mr. Alfred Culverhouse, at 3s. 6d., was accepted, against 3s. 9d. last year. For No. 3 Ward, that of Mr. Charles Killingback, at 4s. per load, against 3s. 6d. last year, was accepted. For No. 4 Ward, that of Mr. A. Culverhouse, at 4s. per load, was accepted, the price last year being the same. For No. 6 Ward, that of Mr. W. T. Williamson, at 3s. 5d. per load, was accepted, against 3s. 9d. last year. The lowest tenders for wards 5, 7, and 8 were so much above those of last year that none of them were accepted.

For the execution of general works to sewers, gullies, buildings, &c., the tender of Mr. Charles Killingback at 7½ per cent. below schedule of prices was accepted, against 15 per cent. last year.

The tender of Mr. Sewell for the supply of Mortfield granite, and of Mr. Culverhouse for Groby and Guernsey granites and of Kentish Rag, were accepted.

DISPUTE AS TO AN ARCHITECTURAL PARTNERSHIP.

WM. H. LYNN *v.* SIR CHARLES LANYON AND JOHN LANYON.

THIS case came before the Rolls Court, Dublin, on the 15th ult., on a reference from Chambers, and to consider the report of the chief clerk. The bill originally had been filed by Wm. Henry Lynn, of Belfast, architect, who had been in partnership in Belfast with the defendants as architects, under the firm of Lanyon & Lynn, and it prayed that an account might be taken of all the dealings and transactions of the partnership between plaintiff and defendants from the 1st of January, 1868, and that the affairs and business of the partnership might be wound up and settled under the direction of the Court. It prayed that any account should include an account of all architects' profits to be derived from the designing and building of a hotel for the Ulster Hotel Company and other works specified in the bill. The plaintiff contended that, in taking the accounts of the partnership there should be included therein the profits arising from the completion of all works respecting which the firm of Lanyon, Lynn, & Lanyon had been professionally consulted or employed before the 1st of July, 1872; that such profits should be declared to be partnership profits, and divided accordingly. The case had been before the chief clerk for several days.

The Master of the Rolls referred the case back to the chief clerk, and directed a certificate to be prepared, the matter to be again brought before the Court.

A BUILDER'S CLAIM FOR PLANS.

PERKINS *v.* WILLIAMS.

IN this case (heard in the Rugby County Court on the 17th ult.) the plaintiff, a builder, claimed 6*l.* 5s., for preparing plans of a house, attending meeting of the Local Board with the same, &c.

It appeared that in 1871 defendant applied to the plaintiff to make plans and estimates for a house he wished to build. Defendant, however, found that it would cost more money than he could afford, and suggested that the matter should stand over for a time. In 1874, defendant again spoke to plaintiff, and made some alterations in the plan. Plaintiff gave a fresh estimate of the cost, and an agreement was made to build the house for 265*l.* On examining the site defendant told plaintiff he must set out the back buildings farther. Mr. Perkins said that was not according to his plans or the estimates. A dispute arose, and the defendant said he would get some one else to do the work, and pay plaintiff what he owed him. He had since, however, refused to compensate him for the work done.

Defendant denied the ordering of the plans. He simply showed him the plans and specifications of an adjoining house, and plaintiff made a copy of them, and got them passed at the Local Board. His offer to pay the plaintiff only referred to the expense Mr. Perkins had been at in setting out the work.

The judge thought the plaintiff was entitled to be paid a reasonable sum for copying the plans. The fixing of the amount was referred to Mr. Manning, architect, of Rugby.

THE SYSTEMATIC MEASUREMENT OF THE HUMAN FIGURE.

SIR,—I begin by quoting the very accurate words of "Meter" in your impression of February 12th, page 152:—"The human frame, like other fluctuating phenomena, oscillates about a certain mean type." This certain mean type has been found out by the ancient Greek sculptors, and recorded by your worthy predecessor, Vitruvius, in his Treatise on Architecture, book iii., cap. i.; and, in order to ascertain how far the proportions of the different races of the human family accord with the proportions given by Vitruvius, as those used by the Greek sculptors of antiquity, the instrument drawn and described in the pamphlet "for the Identification of Persons" (Longman & Co., 1872) was designed. The difficulty of measuring the rounded forms of the human proportions is very great indeed, and no photographic delineation of a man, whether against a reticulated frame or not, would enable one to produce what an architect calls a geometrical elevation of a man or a building, or any other object. The only known way, as far as I am aware, is to draw out the figure, according to a certain scale, from accurate measurements taken on the man or figure itself, whatever it may be.

JOSEPH BONOMI.

The Southend Surveyorship.—At a meeting of the Southend Local Board, on the 23rd ult., out of five selected candidates for the office of surveyor, Mr. Frank Buckham, surveyor to the Newmarket Local Board, was elected.

STAINED GLASS.

Northampton.—A memorial stained-glass window has been unveiled at St. Edmund's Church, Northampton. The window has been erected in memory of the late Mrs. Hughes, wife of the vicar of St. Edmunds, from a design by Messrs. Law & Sons, architects. The two small lancet lights formerly at the west end were considered to be altogether inadequate for the lighting of that part of the church, and it was therefore decided to erect an entirely new window, the masonry of which was executed by Mr. Cross, of Kingsthorpe. The stained-glass has been executed by Messrs. Heaton, Butler, & Bayne. The window consists of three lights, the centre one, however, being at present the only one filled with stained glass, the other two being temporarily glazed with tinted glass of three shades. The subjects, three in number, of the central light, are of a baptismal character. At the top is a representation of Christ receiving little children; in the centre, the subject is the baptism of Christ; and at the bottom, that of the baptism of the gaoler. On either side of the window are scrolls bearing inscriptions. A monumental brass, by Messrs. Hart, Son, & Peard, has been placed on the wall of the church, beneath the new window, bearing an inscription.

Lechlade.—A stained-glass window, by Mayer & Co., has lately been placed in Lechlade Church by Mr. George Milward, of the Manor House, in memory of his late father. It represents the raising of Lazarus.

Plymouth.—The east window of the recently-restored Christ Church, Plymouth, has been filled with stained cathedral glass by Messrs. Fouracre & Watson, of Stonehouse. In the upper portion of the central light is a representation of the Good Shepherd, and in the lower portion a scroll on which is an inscription in memory of Anne Emmeline Metcalf, eldest child of the Rev. James Metcalf, M.A., vicar of the parish, and Anne Emily, his wife, &c.

Abbeydale.—The windows of the new Church of St. John, Abbeydale, Nottinghamshire, have lately been filled with stained glass by Messrs. Mayer & Co. The chancel windows represent the principal events in the life of our Lord, beginning with the Annunciation and Nativity, an angel in the quatrefoil holding a scroll with the words "Let us love one another, for love is of God." In the centre lights are depicted the agony of our Lord, and our Lord bearing his cross, with the Last Supper in the quatrefoil. The third window has the Resurrection and Ascension, while the west window is dedicated to St. John, the patron of the church, and contains a representation of our Lord in glory, as described in the Apocalypse. Underneath is a figure of St. John in the Isle of Patmos, and another representing an incident in the life of the Evangelist. A window near the pulpit, is dedicated to the late Mrs. Roberts. This window, which cost over 100*l.*, represents Mrs. Roberts in the act of feeding the hungry and teaching the ignorant.

Stoke Holy Cross.—The east window of the parish church of Stoke Holy Cross has been filled with stained glass in memory of the late Mrs. E. C. Bailey. The window consists of three Early English lancets. The central light is designed with reference to the dedication of the church, presenting the Cross in the stages of (1) the Curse, (2) the Expiation, (3) the Exaltation. The Saviour bearing the Cross occupies the lowest compartment; a representation of the Crucifixion the centre; and the Cross, surmounted with a Celestial Crown, the uppermost. In the side lights are—on the north, the Nativity and the Baptism of our Lord; and on the south, His Resurrection and Ascension; at the base is the inscription. The window is by Mr. Henry Hughes, of the firm of Ward & Hughes.

Glastonbury.—St. Benedict's Church has just received an addition in the shape of a stained-glass window in memory of the late town-clerk, Mr. Stephen Holman. It is the work of Messrs. Clayton & Bell, and the design represents the figures of Faith, Hope, and Charity, as described by St. Paul. Faith, on the right, grasps the crozier, and holds the Bible in her left arm, turning upwards her countenance to the legend around her head, which states that "She is indeed the substance of things hoped for." Charity, in the centre, casts loving glances on the innocents in her arms, and on her knees; and Hope rests on her anchor, and directs her eyes towards the "Rock of Ages." Under the window, on a brass tablet, is the inscription.

Books Received.

The Late Visitation of Typhoid Fever in the School and Town of Uppingham. E. & F. N. Spon, London.

THIS is a statement of the action of the Sanitary Committee, by the Chairman, and includes reports furnished to the Committee by their medical officer of health, Mr. A. Haviland, and their engineer, Mr. Rogers Field. It contains much that should be suggestive to other bodies, and should be circulated so that the lamentable disaster at Uppingham may not be wholly without advantage. We hear with great regret that the fever has again made its appearance in the neighbourhood.

Miscellanea.

Demolition of Historical Old Houses at Edinburgh.—The Edinburgh Improvement Trustees are (we learn from the *Scotsman*) at present engaged in opening up a connexion between Bristo-street and Nicolson-street by way of Allison-square, and the works have necessitated the demolition of several interesting old buildings in Bristo and Potter-row. Among them is a house in General's-entry, in which at one time resided Mrs. M'Lehose, the "Clarinda" with whom Burns, under the name of "Sylvander," exchanged so many glowing letters. On the south side of the small quadrangle which formed the entry was a mansion, built in the seventeenth century, which tradition assigns as the residence of General Monk during his command in Scotland under Cromwell. A building with which was associated the name of the author of Waverley has been removed in connexion with the trustees' operations. This was Leechman's school, which stood in Hamilton's-entry. In order to form the connexion with Nicolson-street, the Improvement Trust are to remove the central portion of the old pile of buildings which forms Allison-square; and it cannot but be a matter of regret that it has been found necessary to destroy the character of so excellent a specimen of the domestic style of architecture of the last century. In this tenement the poet Campbell wrote "The Pleasures of Hope," but it does not appear that the part in which the poet resided is to be pulled down.

The Hoarding Nuisance.—The *City Press* says,—"There is a *proper* hoarding at the junction of the Embankment with New Bridge-street, that conforms to the line of the footpath and incloses land that will be built upon in time. But beyond it, a few yards to the west, is an *improper* hoarding, built out into and on the public footway. It serves no purpose of usefulness, it is a hideous obstruction and disfigurement, and it has all the appearance of a shanty put up for the purpose of extorting black-mail from somebody. Any one who will take the trouble to peep through the chinks will see that it does not cover a gap, but actually covers a portion of the proper boundary-wall; and this boundary-wall is certainly within the jurisdiction of the Metropolitan Board of Works. We could put our hands on the parties responsible for its existence, but for the present we refrain, on the supposition that they have hitherto been too dull to perceive that in retaining this offensive structure they are guilty of a gross public wrong. But what shall we say of the Metropolitan Board, that it endures this thing so patiently? Is it so occupied with great things that it is oblivious of small things? And if it permits this hoarding, might not a hundred such be put up along the whole line of the Thames Embankment?"

An Auxiliary Use for Board Schools.—The Free Library Committee of the Leicester Town Council, with a spirit of enterprise which might be more generally emulated by similar bodies, has obtained the use of the Board Schools in Syston-street, with a view of trying the experiment of establishing a branch reading-room there in connexion with the free library. The School Board has met the Committee on the most liberal terms, and if the place is successful as a reading-room, a branch of the free library will be established there, and efforts will be made to utilise other board schools in the town in a similar manner. Of course, these reading-rooms will only be open after school-hours. The Syston-street reading-room has been opened with every promise of success.

Philadelphia Exhibition.—Messrs. Brown-Westhead, Moore, & Co., of Hanley, have prepared for the Centennial Exhibition a costly collection of goods in porcelain, earthenware, parian, and majolica. They have had constructed a spacious and elegant pavilion 35 ft. long by 23 ft. wide, and of proportionate height. It is of timber, but the framework is partly concealed by crimson drapery, and partly by an interesting collection of examples of mural decoration by means of tiles executed by a new process. The visitor, on approaching the pavilion, will have his attention arrested at once by the remarkably fine display of mural decoration, which occupies in all a space 100 ft. long by 8 ft. deep. All the tiles employed are decorated by a new patent process, the exclusive right to the use of which, so far as its application to pottery is concerned, is possessed by this house. It is the invention of Mr. Joseph Brown, of Chelsea. The exact particulars of the process are not made public, but we may say that it has this advantage,—that although engraving is the first stage in what may afterwards become elaborately finished pictures, the artist's own work appears on the ware without the intervention of an ordinary engraver. In the interior of the pavilion, one portion represents the wall of a drawing-room tiled from ceiling to floor, and with a mantelpiece also of ceramics. The tiles used for the mantelpiece have a white ground with birds painted thereupon, while the wall space is covered with smaller tiles of darker colour. Next to this is a composition designed for a library, and here the mantelpiece is of white embossed tiles, the embossing being also accomplished by a new process.

Female School of Art.—H.R.H. the Duke of Edinburgh distributed the prizes and medals gained by the successful students of the Female School of Art, Queen-square, Bloomsbury, on the 25th ult., in the theatre of the London University, Burlington-gardens. The Rev. Sir Emilius Bayley opened the proceedings by reading the thirteenth annual report of the committee, which stated that the past had been a most successful year as regarded the number of the students, the prizes won by them, and the quality of the works to which prizes had been awarded. Following on many previous successes, Miss Gann, the lady superintendent of the school, had for the year 1874-75 gained a premium of 40*l.* awarded by the Lords of the Committee of Council on Education, her name being second on the list of 130 competing schools. The report having been adopted, the Duke of Edinburgh presented the prizes to the students, the principal of these rewards being the Gilchrist Scholarship of 50*l.*, taken by Miss Frances Harriet Newton (of the Durham School of Art); a national silver medal and a subscriber's scholarship of 10*l.*, by Miss Gertrude Hamilton; the Queen's gold medal, a national bronze medal, and a third-grade prize, by Miss Ellen Isabella Hancock; the Queen's scholarship, value 30*l.*, with a national bronze medal, and other prizes, by Miss Alice Hanslip (who retains the prize for a second year); and a national gold medal and the Princess of Wales's first scholarship, value 25*l.*, with two other prizes, by Miss Susan Ruth Canton. Professor Donaldson introduced the prize-gainers, and Canon Thorold addressed the meeting.

The Construction of Street Tramways.—At an ordinary meeting of the Manchester Scientific and Mechanical Society, recently held, a paper on "The Construction of Street Tramways, with suggestions for a new section of rails and fastenings for the same," was read by Mr. I. Bowes. Amongst the chief requirements of a good serviceable tramway Mr. Bowes suggested that the rail and its fixings should present as small a surface of iron or any other slippery material on the face of the pavement as possible; that the rail should be of such a form as would give it the greatest strength vertically for the quantity of material in it, and that its strength should be sufficient in itself to prevent deflection, which not only caused a greater amount of traction power to be required, but also loosened the fastenings, and in many ways tended to destroy the efficiency and durability of the tramway. He described what he called the girder tram-rail, which was a rail and girder combined, in which the material was distributed in the proper shape for carrying a vertical pressure or weight,—viz., the girder shape. This form of rail also gave better facilities for connecting the rail ends than any other he had yet met with.

The Weymouth Surveyorship.—The Weymouth Local Board met in committee on the 23rd ult., and made a further selection of four from the 13 candidates originally picked out of 56 applicants. The 13 were,—Messrs. Francis Drake, from Shrewsbury, aged 41; G. J. Stead, Sheffield, 38; R. H. Inch, Croydon, 31; Morgan, Southampton, 32; Lloyd, Reading, 29; R. Bennett, Weymouth, 45; J. J. Webster, Birkenhead, 31; B. D. Henley, Malsty, 34; Walter Bradbury, London, 36; Richard Weaver, Uppingham, 34; H. O. Smith, Oxford, 33; A. Loader, Brighton, 36; J. F. Brown, Weymouth, 35 years. The committee decided that four of the above who obtained the most votes should be those from among whom the ultimate selection should be made. They were the following:—Mr. Loader, Brighton, 19; Mr. Morgan, Southampton, 17; Mr. Inch, Croydon and Plymouth, 9; Mr. Bennett, Weymouth, 9. The final choice was made on Tuesday last, the 29th ult., when the voting was as follows:—For Mr. Morgan, 15; for Mr. Inch, 14; for Mr. Loader, 10; and for Mr. Bennett, 6. The latter was rejected from the second voting, and Mr. Loader did not secure a single vote, while Mr. Morgan had 16 and Mr. Inch 11. The final voting was in favour of Mr. Morgan, who secured 13 votes against Mr. Inch's 5. Mr. Morgan was therefore elected.

Breakage of an Iron Bridge on the North British Railway.—On the 12th ult., the iron bridge on the North British Railway at North Back of Canongate, Edinburgh, a girder of which gave way on the previous evening, was propped with strong wooden stancheons, and both lines of rail were re-opened for traffic early in the forenoon. It is stated that for some time past Mr. Bell, the engineer of the North British Railway Company, has had plans in preparation for the erection of a new bridge over the roadway at Bernard's Brewery, and that the plans are now so far advanced as to admit of operations being commenced immediately. The present cast-iron bridge was constructed in 1845, and at that time was quite strong enough for the traffic which passed over it. Now, however, when engines and tenders weighing 60 tons have in many instances taken the place of machines little more than half that weight, and when between 300 and 400 trains daily pass through the Calton Hill tunnel, a much stronger bridge is required. The new structure will therefore be built of malleable iron, and the cost of its erection is expected to be about 4,000*l.*

Arsenical Wall-paper.—At the Belfast Quarter Sessions, recently, a case of very considerable importance, but of a somewhat novel character, was before the Court. Mr. Webb, linen merchant, of Randalstown, processed Mr. Malcolm, proprietor of an extensive room-paper warehouse in Victoria-street, Belfast, for 22*l.* odd, for expense incurred by the plaintiff "in procuring medicine and medical attendance for his children," through illness brought on by arsenic contained in a room-paper purchased in the defendant's establishment. Dr. Hodges, who examined the paper, proved that it contained arsenic, and it appeared that after it was put on plaintiff's room his children became ill, their throats being ulcerated, and this illness was attributed to the arsenic. It was stated on behalf of Mr. Malcolm that he had no knowledge of arsenic being in the paper; that he had to keep such qualities of paper as suited his customers; and that the paper in question had been selected by the plaintiff. On the 17th ult. the magistrate gave his decision in this case. His worship dismissed the process, on the ground that there was no warranty, expressed or implied, between Mr. Webb, the plaintiff, and Mr. Malcolm, the defendant, that the paper contained no poisonous matter.

Archæological Section of the Birmingham and Midland Institute.—At the monthly meeting of this section, held on the 23rd ult., Mr. W. G. Fretton read a paper on the Benedictine Monastery and Cathedral of Coventry, in which he traced the history and vicissitudes of the various foundations, from the time of the first institution of the monastery by Leofric, down to their demolition at, and the subsequent decay of their ruins after, the general suppression, until now, very few traces of their existence remaining. He was persuaded that a great many more interesting portions of the cathedral remained underground than at present appeared above it, and he suggested that an exploration of the site would form a very interesting field-day to the section.

The Artisans' and Labourers' Dwellings Improvement Act, 1875.—On the motion of Sir Sydney Waterlow, a return has been ordered from the Commissioners of Sewers, from the Metropolitan Board of Works, and from such urban sanitary authorities as have received official representations under the Artisans' and Labourers Dwellings' Improvement Act, 1875, of the number of official representations made to them; of the number, size, and locality of the areas to which they relate; of the number, size, and locality of the areas regarding which resolutions (under Section 3) have been passed, or for which improvement schemes have been made; and of the stage which each improvement scheme has reached; giving the date of each official representation, of each resolution, and of each improvement scheme. And from the Metropolitan Board of Works of any appointment, under Section 13 of the Artisans' and Labourers' Dwellings Improvement Act, 1875, of a medical officer or officers for the purpose of carrying the Act into operation, and of the amount of his or her remuneration.

Slaughter-houses at Greenock.—The question of providing proper slaughter-house accommodation is exciting much attention in Greenock. The present slaughter-house, owned by the Town Council, is situated in a densely populated locality in the centre of the town, and has been declared by the medical officer to be a nuisance. The Council recently resolved to renovate the old buildings, at an expense of between 3,000*l.* and 4,000*l.* The minority in the Council, who are also members of the Police Board, wish a new establishment, which, it is said, will cost at least 9,500*l.* With a view to bring matters to a practical issue, Mr. Erskine, at a meeting of the Police Board on the 25th ult., moved that that body proceed to the erection of a slaughter-house under the powers conferred on them by the Police Act of 1865. A long discussion took place, but the motion was lost by a majority, and the Board resolved not to take any action till it had been ascertained what the Council actually intended to do, whether it would persist in continuing the old buildings, or to secure a site for a new slaughter-house.

The Benevolent Fund of the Institution of Civil Engineers.—A meeting of the contributors to the Benevolent Fund connected with this institution was held on the 22nd ult. In the report read by the honorary secretary, it was stated that the fund was established to afford assistance to necessitous members, associates, and graduates of the Institution of Civil Engineers and their families, and to the families of deceased members, associates, and graduates; also to any one who may have been a member, associate, or graduate, and have paid his subscriptions for five years consecutively at least, or to the family of any such person. While the committee regretted that the subscribers to the fund were not more numerous, there being only 352 annual subscribers, out of a total of 2,373 members, [they announced that there had been an income proper exceeding 2,100*l.*, while the expenses, including twelve grants and office charges, amounted to under 1,500*l.*

Improved Floor Clamp. — Carpenters, cabinet-makers, and others who find it frequently necessary to clamp flooring-boards or portions of furniture together, are provided, by an invention patented June 8, 1875, to Mr. W. D. Clark, of Springfield, Ill., with a novel and simple tool especially adapted to such purposes. It consists of a sleeve, which at its lower extremity carries a cam, and at its upper end has a handle. Passing through the sleeve is a rod having a screw point at its lower end, and turned by the upper handle. Attached to a collar on the sleeve is a rearward extending arm, the end of which is turned downward and toothed so as to engage with the surface of the joist. A slotted and grooved arm is pressed by the cam against the boards, when the said cam is suitably revolved by the handle. The holding arm prevents any rearward motion of the device, which is still further secured by the screw point entering the wood of the joist.

How we Poison Ourselves with Bad Air. The introductory lecture in connexion with the Dale-street (Liverpool) District Sanitary Association was delivered at Waterloo, Mr. Thacker, chairman of the Waterloo Local Board, in the chair, by Mr. T. Mellard Reade, C.E., who gave an exhaustive summary of the principles of sanitary science in relation to engineering and architectural construction.

Rendering Wood Fire and Water Proof. M. P. Folacci has devised a mode of rendering wood waterproof and incombustible, which involves the use of the following composition:—Sulphate of zinc, 55 lb.; American potash, 22 lb.; alum (ammonia base), 44 lb.; oxide of manganese, 22 lb.; sulphuric acid at 60° 22 lb.; river water 55 lb. The above ingredients, with the exception of the sulphuric acid, are mixed in a boiler, where the water is added at a temperature of 113° Fahr. As soon as solution is effected, the acid is gradually poured in. To prepare the wood, the timbers are placed in a suitable chamber, on gratings, and separated by spaces of about ¼ in. The composition is then pumped in to fill completely the receptacle, and is maintained therein in a state of ebullition for three hours. The wood is then withdrawn, and dried in the air. According to the inventor, it becomes practically petrified, and the most intense flame only carbonises the surface very slowly.

The Lincoln Drainage Dispute.—The Lincoln drainage question was before the Queen's Bench Division of the High Court of Justice on the 21st ult., when the *mandamus* applied for by the Local Government Board against the Lincoln Corporation was granted, the Court being unanimously of opinion that no further time could be allowed the Corporation for commencing the work. It was also intimated by the Court that it solely depended upon the action taken in the matter by the Lincoln Corporation during the next three or four months how the *mandamus* should be enforced. Affidavits by the Mayor and Mr. Mansergh, the engineer, were produced on behalf of the Corporation in reply to those filed by the Local Government Board on the application for the Rule in November last.

Darlington Master Builders' Association. The annual meeting of the Darlington Master Builders' Association has just been held. The following officers were elected:—President, Mr. George Marshall; vice-president, Mr. J. C. Martin; treasurer, Mr. R. T. Snaith; secretary, Mr. John Hurworth; together with auditors and a committee of ten. A discussion took place on the demand of the masons for an advance of 3*s.* per week. Several gentlemen considered that the demand in the present state of trade was most unreasonable, an opinion which was generally agreed in. It was reported that the condition of trade was very slack throughout the district, jobs coming in but very slowly.

New Flooring.—A new system of parquet flooring, invented by M. Briffaut, is spoken of. The squares are composed of slips of oak or other wood, or a combination of woods forming patterns; the pieces are held together by a layer of bituminous cement laid hot on their under side; and this cement is in turn covered with a paving tile, so that the three substances are intimately united. In order to obtain a more perfect adherence, conical iron pins are driven through holes left in the tiles and into the wood while the cement is still in a liquid state. The squares are laid in mortar or cement over a layer of sand, and are joined together by very fine iron tongues fitting in grooves.

Something like a Boring Machine.—The *Mining Journal* says that one of the great objections raised against the Channel Tunnel scheme is the length of time it will take to execute; but if we are to believe the *Liberté*, this objection has now disappeared. In fact, according to that paper, the Tunnel can be completed in less than six months! It tells us that a machine has just been invented by which 55 mètres of ground may be pierced through per diem, and it calculates if both the English and the French begin piercing at the same time the Tunnel can be cut out in 144 days!

The Excelsior Lamp.—The peculiarity of this lamp is that the vase of the lamp is expanded so as to gather and concentrate a large quantity of atmosphere upon the flame: by which means an increased quantity of oxygen is forced to come in contact with the flame, resulting, it is claimed, in a white, brilliant light. These lamps may be seen in cluster form in front of the Mansion House, City; and in suspension form, as well as applied to columns and brackets, at the Great Northern Railway Station, King's-cross.

Dublin in Ruins.—At a meeting of the Dublin Statistical Society on the 15th ult., Dr. Grimshaw stated that there were 1,700 ruined houses in Dublin; that is, houses that ought to be taken down, being unfit for human habitation; 122 were utterly ruined.

The Brighton Picture Exhibition.—From a report on the proceedings of the Pavilion Committee, presented at a meeting of the Brighton Town Council on the 16th ult., it appears that the second annual exhibition of pictures at the Corporation Gallery was visited by 198,000 persons, as compared with 60,000 last year, and that upwards of 1,100 pictures were sent in for exhibition, of which 571 were exhibited for sale, and 190 were sold.

The Town Council of Peterborough, acting as the Urban Sanitary Authority, have presented petitions to the Local Government Board to issue provisional orders to empower the said Authority to provide works for water supply, sewerage, and sewage irrigation, according to plans prepared by Mr. John Addy, A.I.C.E., of Peterborough. Application has been made to the Local Government for sanction to borrow 120,000*l.* for the above works.

Painters' and Joiners' Wages at Crieff.—The Crieff journeymen painters have requested the masters to advance, on the 1st of March, their wages from 6½*d.* to 7*d.* per hour; to pay 9*d.* per hour for all extra time; and an allowance of 4*s.* per week when they travel three miles to work. The Crieff operative joiners have also asked a rise from 6*d.* to 7*d.* per hour, the advance to take effect on the 1st of March.

Royal Aldershott Skating Rink.—The tender of the Brunswick Rock Asphalt Paving Company has been accepted for the construction of the proposed new rink for the officers of the Aldershott Division. This company has already laid over 700 tons of asphalt for rinks and other purposes, and the work, executed under the company's manager, Mr. W. Hirst, is stated to have given satisfaction.

Lincoln.—About 1,000*l.*, subscribed to defray the Bishop of Lincoln's costs in the great Coates case, have been devoted by the recipient to the restoration of Bishop Alnwick's tower at the old Palace, Lincoln, for the purpose of lecture-rooms for theological students. Mr. J. Fowler is the architect; Mr. Barker, builder.

Andover Cottage Hospital.—Tenders for the erection of the Cottage Hospital at Andover have just been accepted, according to plans by Mr. White, F.S.A. The work is estimated to cost 1,490*l.*, this being the amount of Messrs. Annett & Son's tender, which has been accepted.

A Good Templars' Hall for Weymouth.—The new hall lately erected for the Good Templars of Weymouth in the High-street, has been opened. The architect is Mr. G. R. Crickmay, and the builder Mr. J. Larcombe. The new edifice is built at the rear of the old Town Hall.

Arabic Numerals in Japan.—The Japanese Government is said to have adopted a singular method for extending a knowledge of the Arabic numerals, with their English names; these are printed on cloth, which is sold at a low price to the peasantry.

New Mission Hall at Derby.—A new Mission-hall in connexion with Holy Trinity Church, Derby, was opened on the 20th ult. The total cost has been about 900*l.* Mr. Edwin Thompson was the builder.

Stockwell-green.—The endeavour to retain Stockwell-green as an open public space has failed, and it is to be speedily covered with buildings.

The Goux System.—The corporation of Sudbury, after an animated discussion, have decided to adopt the Goux closet system.

Architects' Benevolent Society.—The annual meeting of this society will be held at Conduit-street, on Wednesday next, the 8th inst.

TENDERS

For buildings at Helsey and Wainfleet, for the Governors of Bethleham Hospital:—

	House and Buildings.	Cottage.
Dunkley	£1,176 0 0	£202 0 0
Laycock & Co.	1,134 0 0	207 0 0
Hobson & Co.	1,117 0 0	—
Turner	—	203 0 0

For completing four houses in St. Lawrence-road, Notting-hill, for Mr. J. J. Hickmott. Messrs. H. S. & C. A. Legg, architects:—

Hunt	£650 0 0
J. & H. Cooks	638 0 0
Judd & Hawkings	598 0 0
Webber	557 12 0
McFarland	497 0 0

Books Received.

The Late Visitation of Typhoid Fever in the School and Town of Uppingham. E. & F. N. Spon, London.

THIS is a statement of the action of the Sanitary Committee, by the Chairman, and includes reports furnished to the Committee by their medical officer of health, Mr. A. Haviland, and their engineer, Mr. Rogers Field. It contains much that should be suggestive to other bodies, and should be circulated so that the lamentable disaster at Uppingham may not be wholly without advantage. We hear with great regret that the fever has again made its appearance in the neighbourhood.

Miscellanea.

Demolition of Historical Old Houses at Edinburgh. — The Edinburgh Improvement Trustees are (we learn from the *Scotsman*) at present engaged in opening up a connexion between Bristo-street and Nicolson-street by way of Allison-square, and the works have necessitated the demolition of several interesting old buildings in Bristo and Potter-row. Among them is a house in General's-entry, in which at one time resided Mrs. M'Lehose, the "Clarinda" with whom Burns, under the name of "Sylvander," exchanged so many glowing letters. On the south side of the small quadrangle which formed the entry was a mansion, built in the seventeenth century, which tradition assigns as the residence of General Monk during his command in Scotland under Cromwell. A building with which was associated the name of the author of Waverley has been removed in connexion with the trustees' operations. This was Leechman's school, which stood in Hamilton's-entry. In order to form the connexion with Nicolson-street, the Improvement Trust are to remove the central portion of the old pile of buildings which forms Allison-square; and it cannot but be a matter of regret that it has been found necessary to destroy the character of so excellent a specimen of the domestic style of architecture of the last century. In this tenement the poet Campbell wrote "The Pleasures of Hope," but it does not appear that the part in which the poet resided is to be pulled down.

The Hoarding Nuisance.—The *City Press* says,—"There is a *proper* hoarding at the junction of the Embankment with New Bridge-street, that conforms to the line of the footpath and incloses land that will be built upon in time. But beyond it, a few yards to the west, is an *improper* hoarding, built out into and on the public footway. It serves no purpose of usefulness, it is a hideous obstruction and disfigurement, and it has all the appearance of a shanty put up for the purpose of extorting black-mail from somebody. Any one who will take the trouble to peep through the chinks will see that it does not cover a gap, but actually covers a portion of the proper boundary-wall; and this boundary-wall is certainly within the jurisdiction of the Metropolitan Board of Works. We could put our hands on the parties responsible for its existence, but for the present we refrain, on the supposition that they have hitherto been too dull to perceive that in retaining this offensive structure they are guilty of a gross public wrong. But what shall we say of the Metropolitan Board, that it endures this thing so patiently? Is it so occupied with great things that it is oblivious of small things? And if it permits this hoarding, might not a hundred such be put up along the whole line of the Thames Embankment?"

An Auxiliary Use for Board Schools.—The Free Library Committee of the Leicester Town Council, with a spirit of enterprsie which might be more generally emulated by similar bodies, has obtained the use of the Board Schools in Syston-street, with a view of trying the experiment of establishing a branch reading-room there in connexion with the free library. The School Board has met the Committee on the most liberal terms, and if the place is successful as a reading-room, a branch of the free library will be established there, and efforts will be made to utilise other board schools in the town in a similar manner. Of course, these reading-rooms will only be open after school-hours. The Syston-street reading-room has been opened with every promise of success.

Philadelphia Exhibition.—Messrs. Brown-Westhead, Moore, & Co., of Hanley, have prepared for the Centennial Exhibition a costly collection of goods in porcelain, earthenware, parian, and majolica. They have had constructed a spacious and elegant pavilion 35 ft. long by 23 ft. wide, and of proportionate height. It is of timber, but the framework is partly concealed by crimson drapery, and partly by an interesting collection of examples of mural decoration by means of tiles executed by a new process. The visitor, on approaching the pavilion, will have his attention arrested at once by the remarkably fine display of mural decoration, which occupies in all a space 100 ft. long by 8 ft. deep. All the tiles employed are decorated by a new patent process, the exclusive right to the use of which, so far as its application to pottery is concerned, is possessed by this house. It is the invention of Mr. Joseph Brown, of Chelsea. The exact particulars of the process are not made public, but we may say that it has this advantage,—although engraving is the first stage in what may afterwards become elaborately finished pictures, the artist's own work appears on the ware without the intervention of an ordinary engraver. In the interior of the pavilion, one portion represents the wall of a drawing-room tiled from ceiling to floor, and with a mantelpiece also of ceramics. The tiles used for the mantelpiece have a white ground with birds painted thereupon, while the wall space is covered with smaller tiles of darker colour. Next to this is a composition designed for a library, and here the mantelpiece is of white embossed tiles, the embossing being also accomplished by a new process.

Female School of Art.—H.R.H. the Duke of Edinburgh distributed the prizes and medals gained by the successful students of the Female School of Art, Queen-square, Bloomsbury, on the 25th ult., in the theatre of the London University, Burlington-gardens. The Rev. Sir Emilius Bayley opened the proceedings by reading the thirteenth annual report of the committee, which stated that the past had been a most successful year as regarded the number of the students, the prizes won by them, and the quality of the works to which prizes had been awarded. Following on many previous successes, Miss Gann, the lady superintendent of the school, had for the year 1874–75 gained a premium of 40*l.* awarded by the Lords of the Committee of Council on Education, her name being second on the list of 130 competing schools. The report having been adopted, the Duke of Edinburgh presented the prizes to the students, the principal of these rewards being the Gilchrist Scholarship of 50*l.*, taken by Miss Frances Harriet Newton (of the Durham School of Art); a national silver medal and a subscriber's scholarship of 10*l.*, by Miss Gertrude Hamilton; the Queen's gold medal, a national bronze medal, and a third-grade prize, by Miss Ellen Isabella Hancock; the Queen's scholarship, value 30*l.*, with a national bronze medal, and other prizes, by Miss Alice Hanslip (who retains the prize for a second year); and a national gold medal and the Princess of Wales's first scholarship, value 25*l.*, with two other prizes, by Miss Susan Ruth Canton. Professor Donaldson introduced the prize-gainers, and Canon Thorold addressed the meeting.

The Construction of Street Tramways.—At an ordinary meeting of the Manchester Scientific and Mechanical Society, recently held, a paper on "The Construction of Street Tramways, with suggestions for a new section of rails and fastenings for the same," was read by Mr. I. Bowes. Amongst the chief requirements of a good serviceable tramway Mr. Bowes suggested that the rail and its fixings should present as small a surface of iron or any other slippery material on the face of the pavement as possible; that the rail should be of such a form as would give it the greatest strength vertically for the quantity of material in it, and that its strength should be sufficient in itself to prevent deflection, which not only caused a greater amount of traction power to be required, but also loosened the fastenings, and in many ways tended to destroy the efficiency and durability of the tramway. He described what he called the girder tram-rail, which was a rail and girder combined, in which the material was distributed in the proper shape for carrying a vertical pressure or weight,—viz., the girder shape. This form of rail also gave better facilities for connecting the rail ends than any other he had yet met with.

The Weymouth Surveyorship. — The Weymouth Local Board met in committee on the 23rd ult., and made a further selection of four from the 13 candidates originally picked out of 56 applicants. The 13 were,—Messrs. Francis Drake, from Shrewsbury, aged 41; G. J. Stead, Sheffield, 38; R. H. Inch, Croydon, 31; Morgan, Southampton, 32; Lloyd, Reading, 29; R. Bennett, Weymouth, 45; J. J. Webster, Birkenhead, 31; B. D. Henley, Maisty, 34; Walter Bradbury, London, 36; Richard Weaver, Uppingham, 34; H. O. Smith, Oxford, 33; A. Loader, Brighton, 36; J. F. Brown, Weymouth, 35 years. The committee decided that four of the above who obtained the most votes should be those from among whom the ultimate selection should be made. They were the following:—Mr. Loader, Brighton, 19; Mr. Morgan, Southampton, 17; Mr. Inch, Croydon and Plymouth, 9; Mr. Bennett, Weymouth, 9. The final choice was made on Tuesday last, the 29th ult., when the voting was as follows:—For Mr. Morgan, 15; for Mr. Inch, 14; for Mr. Loader, 10; and for Mr. Bennett, 6. The latter was rejected from the second voting, and Mr. Loader did not secure a single vote, while Mr. Morgan had 16 and Mr. Inch 11. The final voting was in favour of Mr. Morgan, who secured 13 votes against Mr. Inch's 5. Mr. Morgan was therefore elected.

Breakage of an Iron Bridge on the North British Railway.—On the 12th ult., the iron bridge on the North British Railway at North Back of Canongate, Edinburgh, a girder of which gave way on the previous evening, was propped with strong wooden stancheons, and both lines of rail were re-opened for traffic early in the forenoon. It is stated that for some time past Mr. Bell, the engineer of the North British Railway Company, has had plans in preparation for the erection of a new bridge over the roadway at Bernard's Brewery, and that the plans are now so far advanced as to admit of operations being commenced immediately. The present cast-iron bridge was constructed in 1845, and at that time was quite strong enough for the traffic which passed over it. Now, however, when engines and tenders weighing 60 tons have in many instances taken the place of machines little more than half that weight, and when between 300 and 400 trains daily pass through the Calton Hill tunnel, a much stronger bridge is required. The new structure will therefore be built of malleable iron, and the cost of its erection is expected to be about 4,000*l.*

Arsenical Wall-paper. — At the Belfast Quarter Sessions, recently, a case of very considerable importance, but of a somewhat novel character, was before the Court. Mr. Webb, linen merchant, of Randalstown, processed Mr. Malcolm, proprietor of an extensive room-paper warehouse in Victoria-street, Belfast, for 22*l.* odd, for expense incurred by the plaintiff "in procuring medicine and medical attendance for his children," through illness brought on by arsenic contained in a room-paper purchased in the defendant's establishment. Dr. Hodges, who examined the paper, proved that it contained arsenic, and it appeared that after it was put on plaintiff's room his children became ill, their throats being ulcerated, and this illness was attributed to the arsenic. It was stated on behalf of Mr. Malcolm that he had no knowledge of arsenic being in the paper; that he had to keep such qualities of paper as suited his customers; and that the paper in question had been selected by the plaintiff. On the 17th ult. the magistrate gave his decision in this case. His worship dismissed the process, on the ground that there was no warranty, expressed or implied, between Mr. Webb, the plaintiff, and Mr. Malcolm, the defendant, that the paper contained no poisonous matter.

Archæological Section of the Birmingham and Midland Institute.—At the monthly meeting of this section, held on the 23rd ult., Mr. W. G. Fretton read a paper on the Benedictine Monastery and Cathedral of Coventry, in which he traced the history and vicissitudes of the various foundations, from the time of the first institution of the monastery by Leofric, down to their demolition at, and the subsequent decay of their ruins after, the general suppression, until now, very few traces of their existence remaining. He was persuaded that a great many more interesting portions of the cathedral remained underground than at present appeared above it, and he suggested that an exploration of the site would form a very interesting field-day to the section.

The Artisans' and Labourers' Dwellings Improvement Act, 1875.—On the motion of Sir Sydney Waterlow, a return has been ordered from the Commissioners of Sewers, from the Metropolitan Board of Works, and from such urban sanitary authorities as have received official representations under the Artisans' and Labourers Dwellings' Improvement Act, 1875, of the number of official representations made to them; of the number, size, and locality of the areas to which they relate; of the number, size, and locality of the areas regarding which resolutions (under Section 3) have been passed, or for which improvement schemes have been made; and of the stage which each improvement scheme has reached; giving the date of each official representation, of each resolution, and of each improvement scheme. And from the Metropolitan Board of Works of any appointment, under Section 13 of the Artisans' and Labourers' Dwellings Improvement Act, 1875, of a medical officer or officers for the purpose of carrying the Act into operation, and of the amount of his or her remuneration.

Slaughter-houses at Greenock.—The question of providing proper slaughter-house accommodation is exciting much attention in Greenock. The present slaughter-house, owned by the Town Council, is situated in a densely populated locality in the centre of the town, and has been declared by the medical officer to be a nuisance. The Council recently resolved to renovate the old buildings, at an expense of between 3,000*l.* and 4,000*l.* The minority in the Council, who are also members of the Police Board, wish a new establishment, which, it is said, will cost at least 9,500*l.* With a view to bring matters to a practical issue, Mr. Erskine, at a meeting of the Police Board on the 25th ult., moved that that body proceed to the erection of a slaughter-house under the powers conferred on them by the Police Act of 1865. A long discussion took place, but the motion was lost by a majority, and the Board resolved not to take any action till it had been ascertained what the Council actually intended to do, whether it would persist in continuing the old buildings, or to secure a site for a new slaughter-house.

The Benevolent Fund of the Institution of Civil Engineers.—A meeting of the contributors to the Benevolent Fund connected with this institution was held on the 22nd ult. In the report read by the honorary secretary, it was stated that the fund was established to afford assistance to necessitous members, associates, and graduates of the Institution of Civil Engineers and their families, and to the families of deceased members, associates, and graduates; also to any one who may have been a member, associate, or graduate, and have paid his subscriptions for five years consecutively at least, or to the family of any such person. While the committee regretted that the subscribers to the fund were not more numerous, there being only 352 annual subscribers, out of a total of 2,373 members, [they announced that there had been an income proper exceeding 2,100*l.*, while the expenses, including twelve grants and office charges, amounted to under 1,500*l.*

Improved Floor Clamp. — Carpenters, cabinet-makers, and others who find it frequently necessary to clamp flooring-boards or portions of furniture together, are provided, by an invention patented June 8, 1875, to Mr. W. D. Clark, of Springfield, Ill., with a novel and simple tool especially adapted to such purposes. It consists of a sleeve, which at its lower extremity carries a cam, and at its upper end has a handle. Passing through the sleeve is a rod having a screw point at its lower end, and turned by the upper handle. Attached to a collar on the sleeve is a rearward extending arm, the end of which is turned downward and toothed so as to engage with the surface of the joist. A slotted and grooved arm is pressed by the cam against the boards, when the said cam is suitably revolved by the handle. The holding arm prevents any rearward motion of the device, which is still further secured by the screw point entering the wood of the joist.

How we Poison Ourselves with Bad Air. The introductory lecture in connexion with the Dale-street (Liverpool) District Sanitary Association was delivered at Waterloo, Mr. Thacker, chairman of the Waterloo Local Board, in the chair, by Mr. T. Mellard Reade, C.E., who gave an exhaustive summary of the principles of sanitary science in relation to engineering and architectural construction.

Rendering Wood Fire and Water Proof. M. P. Folacci has devised a mode of rendering wood waterproof and incombustible, which involves the use of the following composition:—Sulphate of zinc, 55 lb.; American potash, 22 lb. alum (ammonia base), 44 lb.; oxide of manganese, 22 lb.; sulphuric acid at 60° 22 lb.; river water 55 lb. The above ingredients, with the exception of the sulphuric acid, are mixed in a boiler, where the water is added at a temperature of 113° Fahr. As soon as solution is effected, the acid is gradually poured in. To prepare the wood, the timbers are placed in a suitable chamber, on gratings, and separated by spaces of about ¼ in. The composition is then pumped in to fill completely the receptacle, and is maintained therein in a state of ebullition for three hours. The wood is then withdrawn, and dried in the air. According to the inventor, it becomes practically petrified, and the most intense flame only carbonises the surface very slowly.

The Lincoln Drainage Dispute.—The Lincoln drainage question was before the Queen's Bench Division of the High Court of Justice on the 21st ult., when the *mandamus* applied for by the Local Government Board against the Lincoln Corporation was granted, the Court being unanimously of opinion that no further time could be allowed the Corporation for commencing the work. It was also intimated by the Court that it solely depended upon the action taken in the matter by the Lincoln Corporation during the next three or four months how the *mandamus* should be enforced. Affidavits by the Mayor and Mr. Mansergh, the engineer, were produced on behalf of the Corporation in reply to those filed by the Local Government Board on the application for the Rule in November last.

Darlington Master Builders' Association. The annual meeting of the Darlington Master Builders' Association has just been held. The following officers were elected:—President, Mr. George Marshall; vice-president, Mr. J. C. Martin; treasurer, Mr. R. T. Snaith; secretary, Mr. John Hurworth; together with auditors and a committee of ten. A discussion took place on the demand of the masons for an advance of 3*s.* per week. Several gentlemen considered that the demand in the present state of trade was most unreasonable, an opinion which was generally agreed in. It was reported that the condition of trade was very slack throughout the district, jobs coming in but very slowly.

New Flooring.—A new system of parquet flooring, invented by M. Briffaut, is spoken of. The squares are composed of slips of oak or other wood, or a combination of woods forming patterns; the pieces are held together by a layer of bituminous cement laid hot on their under side; and this cement is in turn covered with a paving tile, so that the three substances are intimately united. In order to obtain a more perfect adherence, conical iron pins are driven through holes left in the tiles and into the wood while the cement is still in a liquid state. The squares are laid in mortar or cement over a layer of sand, and are joined together by very fine iron tongues fitting in grooves.

Something like a Boring Machine.—The *Mining Journal* says that one of the great objections raised against the Channel Tunnel scheme is the length of time it will take to execute; but if we are to believe the *Liberté*, this objection has now disappeared. In fact, according to that paper, the Tunnel can be completed in less than six months! It tells us that a machine has just been invented by which 55 mètres of ground may be pierced through per diem, and it calculates if both the English and the French begin piercing at the same time the Tunnel can be cut out in 144 days!

The Excelsior Lamp.—The peculiarity of this lamp is that the vase of the lamp is expanded so as to gather and concentrate a large quantity of atmosphere upon the flame: by which means an increased quantity of oxygen is forced to come in contact with the flame, resulting, it is claimed, in a white, brilliant light. These lamps may be seen in cluster form in front of the Mansion House, City; and in suspension form, as well as applied to columns and brackets, at the Great Northern Railway Station, King's-cross.

Dublin in Ruins.—At a meeting of the Dublin Statistical Society on the 15th ult., Dr. Grimshaw stated that there were 1,700 ruined houses in Dublin; that is, houses that ought to be taken down, being unfit for human habitation; 123 were utterly ruined.

The Brighton Picture Exhibition.—From a report on the proceedings of the Pavilion Committee, presented at a meeting of the Brighton Town Council on the 16th ult., it appears that the second annual exhibition of pictures at the Corporation Gallery was visited by 198,000 persons, as compared with 60,000 last year, and that upwards of 1,100 pictures were sent in for exhibition, of which 571 were exhibited for sale, and 190 were sold.

The Town Council of Peterborough, acting as the Urban Sanitary Authority, have presented petitions to the Local Government Board to issue provisional orders to empower the said Authority to provide works for water supply, sewerage, and sewage irrigation, according to plans prepared by Mr. John Addy, A.I.C.E., of Peterborough. Application has been made to the Local Government for sanction to borrow 120,000*l.* for the above works.

Painters' and Joiners' Wages at Crieff.—The Crieff journeymen painters have requested the masters to advance, on the 1st of March, their wages from 6½*d.* to 7*d.* per hour; to pay 9*d.* per hour for all extra time; and an allowance of 4*s.* per week when they travel three miles to work. The Crieff operative joiners have also asked a rise from 6*d.* to 7*d.* per hour, the advance to take effect on the 1st of March.

Royal Aldershott Skating Rink.—The tender of the Brunswick Rock Asphalt Paving Company has been accepted for the construction of the proposed new rink for the officers of the Aldershott Division. This company has already laid over 700 tons of asphalt for rinks and other purposes, and the work, executed under the company's manager, Mr. W. Hirst, is stated to have given satisfaction.

Lincoln.—About 1,000*l.*, subscribed to defray the Bishop of Lincoln's costs in the great Coates case, have been devoted by the recipient to the restoration of Bishop Alnwick's tower at the old Palace, Lincoln, for the purpose of lecture-rooms for theological students. Mr. J. Fowler is the architect; Mr. Barker, builder.

Andover Cottage Hospital.—Tenders for the erection of the Cottage Hospital at Andover have just been accepted, according to plans by Mr. White, F.S.A. The work is estimated to cost 1,490*l.*, this being the amount of Messrs. Annett & Son's tender, which has been accepted.

A Good Templars' Hall for Weymouth.—The new hall lately erected for the Good Templars of Weymouth in the High-street, has been opened. The architect is Mr. G. R. Crickmay, and the builder Mr. J. Larcombe. The new edifice is built at the rear of the old Town Hall.

Arabic Numerals in Japan.—The Japanese Government is said to have adopted a singular method for extending a knowledge of the Arabic numerals, with their English names; these are printed on cloth, which is sold at a low price to the peasantry.

New Mission Hall at Derby.—A new Mission-hall in connexion with Holy Trinity Church, Derby, was opened on the 20th ult. The total cost has been about 900*l.* Mr. Edwin Thompson was the builder.

Stockwell-green.—The endeavour to retain Stockwell-green as an open public space has failed, and it is to be speedily covered with buildings.

The Goux System.—The corporation of Sudbury, after an animated discussion, have decided to adopt the Goux closet system.

Architects' Benevolent Society.—The annual meeting of this society will be held at Conduit-street, on Wednesday next, the 8th inst.

TENDERS

For buildings at Helsey and Wainfleet, for the Governors of Bethleham Hospital:—

	House and Buildings.	Cottage.
Dunkley	£1,176 0 0	£202 0 0
Laycock & Co.	1,134 0 0	207 0 0
Hobson & Co.	1,117 0 0	—
Turner	—	203 0 0

For completing four houses in St. Lawrence-road, Notting-hill, for Mr. J. J. Hickmott. Messrs. H. S. & C. A. Legg, architects:—

Hunt	£650 0 0
J. & H. Cocks	638 0 0
Judd & Hawkings	598 0 0
Webber	557 12 0
McFarland	497 0 0

For new Lincoln County Hospital. Mr. A. Graham, architect. Quantities supplied :—

Bustard	£31,277	0	0
Hill, Higgs, & Co.	24,800	0	0
Pattinson Brothers	23,700	0	0
Vickers	23,000	0	0
Sherwin	22,852	0	0
Dennitt	22,835	0	0
Warburton	21,900	0	0
Barnes & Wright (accepted)	21,100	0	0
Huddlestone & Son	20,938	0	0

For alterations and additions to Nettleham Hall, for Mr. Franklin Hood. Mr. W. Watkins, architect. Quantities supplied :—

Sims	£3,975	0	0
Brooks	3,963	0	0
Close	3,892	0	0
Bell & Middleton	3,760	0	0
Taylor & Son (accepted)	3,734	0	0

For new police station, Hunstanton, Norfolk, for the Magistrates of the County of Norfolk. Mr. R. M. Phipson, architect :—

Farrow	£595	0	0
Bardell	550	0	0
Beeton	495	0	0
Nelson	448	10	0
Fisher (accepted)	425	0	0

For board schools at Burston, Norfolk. Mr. R. M. Phipson, architect :—

Grimwood	£925	0	0
Ludkin	920	0	0
Limmer	862	0	0
Bishop (accepted)	825	0	0

For additions to Tharston Rectory, Norfolk. Mr. R. M. Phipson, architect :—

Downing	£903	0	0
Ludkin	826	0	0
Hawes	660	0	0
Bishop (accepted)	580	0	0

For alterations and additions to the County Lunatic Asylum, at Thorpe, near Norwich. Mr. R. M. Phipson, architect :—

Downing	£2,889	0	0
Youngs	2,879	0	0
Hawes	2,850	0	0
Newell	2,836	0	0

For restoration of Kirby Bedon Church, Norfolk :—

	Chancel.	Nave.
Ludkin (accepted)	£293 10 0	£515 0 0

For the foundations for new lunatic asylum for the city of Norwich. Mr. R. M. Phipson, architect :—

Youngs	£7,375	0	0
Botterill & Co.	7,300	0	0
Downing (accepted)	6,989	0	0

For the restoration of Burlingham St. Andrew's Church, Norfolk. Mr. R. M. Phipson, architect :—

Evans & Durrant (accepted)	£921	10	6

For the erection of mill building, including machinery, water-wheel, excavation, sluices, &c., at Brompton, Churchstoke. Messrs. Powell & Swettenham, architects :—

Contracts 1 *and* 2.

Hamer & Sons	£1,385	0	0
Gough & Sons	1,165	10	0

Contract 3.

Holroyd, Horsfield, & Wilson	£1,400	0	0
Stevenson	1,325	0	0
Newtown Foundry Company	1,150	0	0
Alexander & Sons	1,050	0	0

For four houses at Teddington, for Mr. A. Sedley. Mr. W. G. Bartlett, architect. Quantities supplied by Messrs. Stoner & Sons :—

Aviss & Sons	£6,100	0	0
Collis & Co.	6,040	0	0
Wood	5,994	0	0
Bywater	5,925	13	0
Conder	5,920	0	0
Bonell & Harris	5,910	0	0
Ashby & Co.	5,854	0	0
Goddard	5,086	0	0

For new front, &c., 94, Western-road, Brighton. Mr. A. Loader, architect :—

Bruton	£442	0	0
Newenham (accepted)	421	0	0

For new roof and repairs, 33, Crown-street, Brighton. Mr. A. Loader, architect :—

Garrett	£106	0	0
Newnham (accepted)	104	5	0

For new entrance lodge, new ball-room, terrace wall, &c., at Swiss-gardens, New Shoreham, Sussex. Mr. A. Loader, architect :—

Reid (accepted)	£1,200	0	0

For widening and re-forming Hole Farm-road, from Pondbay-hill (top of Ore-lane), to junction with St. Helen's-road, Hastings, including construction of drain and laying down granite kerb :—

Howell & Son	£1,246	0	0
Hughes	1,125	0	0
Vidler	1,098	0	0

Accepted for the construction of about three miles length of main drainage, in the pariah of Ore, Hastings, from Pondbay Bridge to Fairlight Down :—

King	£3,200	0	0

For alterations and additions to premises, High-street, Grays, Essex, for Mr. Horncastle. Mr. W. T. Gosling, architect. Quantities supplied :—

Wood	£923	0	0
Pavit	907	12	0
Golden	900	0	0
Pickersgill Brothers (accepted)	895	0	0

For roadmaking and drainage works at Woodford, Essex, for the British Land Company, Limited :—

Marshall	£960	0	0
Peill	680	0	0
Bloomfield	610	0	0
Pizzey	590	0	0
Richardson	558	0	0
Jackson (accepted)	555	0	0

For alterations and repairs to cottages in Goslin's-yard, High-street, Battersea, for Mr. James J. Morgan. Messrs. Ebbetts & Cobb, architects :—

Steel Brothers	£250	0	0

For new warehouse, Newgate-street, for Messrs. Hutton & Co. Quantities by Messrs. Batstone & Sons. Mr. H. H. Collins, architect :—

Mitchell	£4,158	0	0
Browne & Robinson	4,012	0	0
Ball	3,965	0	0
Merritt & Ashby	3,923	0	0
Crabb	3,886	0	0
Bayes Bros. & Allen	3,867	0	0
Brass	3,862	0	0
Newmann & Mann	3,737	0	0
Pritchard	3,710	0	0
Kirk & Randall	3,697	0	0
Mark	3,454	0	0
Oliver (accepted)	3,415	0	0

For rebuilding No. 35, Little Russell-street, Bloomsbury, exclusive of asphalte floors and fittings, for the Express Country Milk Company, Limited. Mr. W. Paice, architect :—

Patman & Fotheringham	£1,810	0	0
Heath	1,730	0	0
Macey	1,699	0	0
Downs & Co.	1,685	0	0
Wagstaff & Co.	1,650	0	0
Carter	1,630	0	0

TO CORRESPONDENTS.

H. H. J.—G. J.—S. W.—H. F.—W. S.—C. E. F.—W. H. M.—H. J. J.—J. S.—A. B.—E. & S.—B.—J. W. G.—W. D. C.—R. W.—S. T.—A. S.—L. L.—C. C. H.—B. & H.—J. M.—F. P.—W.—E. B. R.—F. M.—A. L.—J. K. C.—G. A. R.—J. C. M.—B. I.—Ch. L., Paris (there are no official regulations under which the restoration of Historical Monuments is carried on in Great Britain).—G. T. C. (shall be proceeded with).—N. W. (declined, with thanks).—F. C. (thanks).—Venus de Milo (in type).—W. B. (next week).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Now Ready, the THIRTY-THIRD VOLUME of "THE BUILDER" (bound), for the year 1875, *price One Guinea. Also,*

CLOTH CASES for binding the Numbers, price Three Shillings each.

The Publisher cannot be responsible for TESTIMONIALS *left at the Office in reply to Advertisements, and strongly recommends that* COPIES ONLY *should be sent.*

Advertisements cannot be received for the current week's issue later than THREE o'clock p.m. *on THURSDAY.*

CHARGES FOR "WANTED" ADVERTISEMENTS.

SITUATIONS VACANT.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under .. 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied *direct* from the Office, to residents in any part of the United Kingdom at the rate of 19s. per annum. *Payable in Advance.*

Halfpenny stamps accepted for amounts under 5s. Any larger sum should be remitted by Money Order, payable at the Post Office, King-street, Covent-garden, W.C. to DOUGLAS FOURDRINIER.

Bath Stone of best quality.
RANDELL, SAUNDERS, & CO. (Limited),
Quarrymen and Stone Merchants.
List of Prices at the Quarries and Depôts; also cost of transit to any part of the Kingdom, on application to
Bath Stone Office, Corsham, Wilts. [ADVT.]

Patent Selenitic Cement, with double the usual sand, is much stronger than ordinary mortar. Plastering finished in much less time at less cost. Excellent substitute for Portland cement for Concrete at less than half its price.—21½, Millbank-street, S.W. [ADVT.]

Asphalte.
Seyssel, Patent Metallic Lava and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.]

Whitland Abbey Green Slates.—These Quarries are now fully opened out, and are producing Slates in all sizes, and in any quantity: sound, and of choice green tint.—For samples and further particulars, apply to the MANAGER, at the Quarries, Narberth-road, R.S.O. [ADVT.]

MICHELMORE & REAP,

Manufacturers of

CHARLES COLLINGE'S PATENT

COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
and IMPROVED GATE FITTINGS of every Description.
36A, BOROUGH ROAD,
LONDON, S.E.

Discount to Builders.
Illustrated Sheet on application.

P. E. CHAPPUIS,
Patentee of DAYLIGHT REFLECTORS,

ALSO OF

EVERY DESCRIPTION of REFLECTORS for GAS, LAMPS, LANTERNS, &c. for the LIME, ELECTRIC, and MAGNESIUM LIGHTS.

N.B.—Reflectors made to any Shape or Pattern for Scientific or any other purposes.

MANUFACTORY: 69, FLEET STREET, LONDON.

ORNAMENTAL TREES, CONIFERÆ, &c.

A LARGE STOCK, 5 ft. to 12 ft. high, in fine condition. Selections at 60s. per 100, free on Rail.
Also Fruit Trees and general Nursery Stock very Cheap, to effect a clearance.
CHARLES NOBLE, BAGSHOT.

IMPORTANT NOTICE.

TO PUBLIC LAND COMPANIES, BUILDERS, CONTRACTORS, AND GENERAL PLANTERS.

Ornamental Trees, Evergreens, Flowering Shrubs, Standard and Dwarf Roses, Fruit Trees, Climbing Plants, &c.

STANDING over 100 ACRES, TO BE SOLD. They comprise the following :—

MOUNTAIN ASH, 8 to 10 feet.
BEECH, 6, 7, and 8 to 10 feet.
BIRCH (Silver), 7, 10, 12, and 15 feet.
CHESTNUT (Horse), 7, 10 and 12 feet.
,, (Spanish), 7, 10, and 12 feet.
ELMS of sorts, 6 to 8 feet.
LABURNUMS, 8 to 10 feet.
LIMES, 6, 8, and 10 feet.
MAPLE (Norway), 8, 10, 12, and 15 feet.
OAK (English), 8, 10, and 12 feet.
POPLARS (Black Italian), 8, 10, 12, and 15 ft.
,, (Lombardy), 8, 10, 12, and 15 feet.
,, (Ontarian), 8 to 10 feet.
SYCAMORE, 8, 10, and 12 feet.

Double Flowering Cherries, Scarlet and other Thorns, Flowering Crabs, Purple Beech, &c.

FINE CONIFERÆ and EVERGREENS, consisting of Austrian, Weymouth, and other Pines, Abies Douglasii, Cedrus Deodora, Cupressus Lawsoniana, Chinese Juniper's, Thuja Lobbii, Wearcana and other Arbor Vitæ, Aucuba, Berberies, Hollies (Green and Variegated), Box, Laurels, Laurestinus, Privets, Evergreen Oaks, Yews of sorts, and many others.

RHODODENDRONS, in common and finest named kinds of all sizes, and in any quantities, Halmias, &c.

FLOWERING SHRUBS, such as Lilacs, Deutzias, Guelder Rose, Forsythias, Althæas, Spiræas, Weigelias, &c.

ROSES, Standard, Half-Standard, and Dwarfs, in all best varieties.

FRUIT TREES,—Apples, Pears, Plums, Cherries, Peaches, Nectarines, Currants, Raspberries, &c.

CLIMBING PLANTS,—Clematis, Honeysuckles, Jasmines, Pyrus Japonica, Roses, Ivies, Virginian Creepers, &c.

Plans prepared for Laying out and Planting Public Parks, Building Estates, or Private Grounds.
Catalogues forwarded on application, and special Quotations for large Quantities. Inspection particularly invited.

MAURICE YOUNG, Milford Nurseries, near Godalming, Surrey.